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A retirement (temporary)
The ever helpful assistant librarian, Pharmaceutical Society, Miss D. A. Jones, retired at the end of 1979. Whilst all members of BSHP will wish her well in her retirement, many historians and students will be pleased to know her expertise will continue to be available to members as she has agreed to finish cataloguing the library collection and advise on a part-time basis.

A Scottish appointment
Mrs. Linda Cameron, BSHP's indefatigable secretary, has been elected to serve as a member of Council of the Scottish Society of the History of Medicine. The appointment is for a three-year period. Mrs. Cameron is also the staff pharmacist at the Scottish Department of the Pharmaceutical Society.

Obituary
Members of the Society will regret the death of Nicholas Arthur Herdman, FPS, Hingham, Norfolk, on December 17, 1979. "Nick" Herdman was the first editor of the *Pharmaceutical Historian.* Members will know that the Society was formed in June 1967. At a Committee meeting held shortly after this it was agreed that the Society should sponsor two publications — one, the *Pharmaceutical Historian* to convey news of a general character, notes and short papers; the other the Society's *Transactions,* intended for original research papers.

Nick Herdman readily agreed to act as Editor of the *Pharmaceutical Historian* and he entered on his task with such zest and ability that only four months after the Society was inaugurated the first number (Vol. I No. 1) appeared in October 1967. It was he who set the style and found the design that adorns the title page. It was his suggestion that the second (and future issues) should carry a note of recent publications relating to the history of pharmacy and the first of these appeared in the second number, March 1968.

To our great regret Nick had then to relinquish the editorship because of other pressing duties, but his scholarship and wise guidance set the tone for successive issues of the *Pharmaceutical Historian.*

Mrs. J.G.L. Burnby

Congratulations
Mrs. J. G. L. Burnby, B.Pharm, MPS, has been awarded the degree of doctor of philosophy of the University of London for a thesis entitled "A Study of the English Apothecary from 1660 to 1760, with special reference to the Provinces".

A founder member of the Society and its president from 1975-77, Dr. Burnby has contributed a number of articles to the *Pharmaceutical Historian.*

Her thesis suggests that the apothecary of the period under review has been greatly undervalued and that his true worth to the science of his day and to the community has been incorrectly assessed by medical historians.

Many apothecaries played important civic roles such as town clerks, mayors and aldermen, whilst their shops may be described as miniature health centres. The whole 'medical team' relied on him and his shop and it can be seen why they gained the support of the general populace and at the same time earned the physicians' jealousy. This focal point was no 'shop' in the sense of a self-service store or seedy down-at-the-heel corner shop where dubious transactions took place at the back door. Furthermore her researches into the retail trade of the early 18th century indicate that the lowering of social status inherent in being a 'mere' shopkeeper may well be a Victorian accretion of an idea which had begun to emerge some seventy years earlier.

Dr. Burnby is also currently chairman of the Edmonton Hundred Historical Society.

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Sugar and Spice and All Things Nice

by J. BURNBY

What dreams of exotic lands, of coral strands and waving palms, of maharajahs and rubies the size of a pigeon's egg are conjured up by the words 'spice trade'. Men in their leaky cockle-shell boats dared the unknown to find a way to the 'gorgeous East' and built great overseas Empires at a time when it was not regarded as immoral to do so. No one was more successful in trade or Empire building than the English East India Company; so closely is its name associated with India that it comes as something of a surprise to find that the Honourable Company had holdings in Sumatra as well.

In the early years of the 1770's a young man, Charles Miller, in the service of the company was stationed on that island. His father was Philip Miller the famous gardener of the apothecaries' Physick Garden at Chelsea. Charles made a number of trips to the hilly interior and to the offshore islands of Engaro and Fortune in order to explore the "productions of those places". Some of his observations were printed in the Transactions of the Royal Society after they had been read on 29 January 1778. He wrote that he was stationed at Fort Marlborough which was about one-and-a-half miles south of the Malay town of Bencoolen where the factory had been until 1710 when it was moved as it proved to be unhealthy. The settlement took its name from a fort which had been blown up by the French in 1761 when they deserted it, and it was still in the same state. "The English settled here (exclusive of the military) are between seventy and eighty, of which about fifty are at Marlbro'. They live full as freely as in England, and yet we have lost but one gentleman during the last six months; proof that this climate is not very unhealthy" and "is far from being so disagreeably hot as it is represented to be, or as one might expect from our vicinity to the line; the thermometer . . . is never lower in a morning at six than 69° or higher than 76°. At noon it varies from 79° to 88°; and at eight p.m. from 73° to 78° or 80°. I have only once seen it at 90° . . ."

"The houses here are, almost all, built, cieled, roofed, and floored, with a kind of reed called bamboo, and thatched with the leaves of the sage-tree, and would all be called cottages in England, making a very mean appearance. They are placed in no kind of order; most of them are raised from the ground on wood or brick pillars six or eight feet high; within they are not much unlike a set of rooms in a college, as they consist of one large room called a hall, out of which two doors lead, the one to a bed-room and the other to an office or study."

"The people who inhabit the coast are Malays, who came hither from the peninsula of Malacca: but the interior parts are inhabited by a very different people, and who have hitherto had no connexion with the Europeans." Miller was one of the first to come in contact with these people. "This country is very hilly, and the access to it exceedingly difficult, there being no possibility of a horse going over the hills. I was obliged to walk the whole way, and in many places barefoot. . . . The inhabitants are a free people and live in small villages called Doosans independent of each other and governed each by its own chief. . . . They have almost all of them, particularly the women, large swellings in the throat, some nearly as big as a man's head, but in general as big as an ostrich's egg, like the goitres of the Alps. It is by them said to be owing to their drinking a cold white water; I fancy it must be some mineral water they mean. Near their country is a volcano: it is very mountainous and abounds with sulphur, and I dare say with metals too, though no mines are worked here. If this distemper be produced here by this cause, perhaps in the Alpine countries it may take its origin from a similar one, and not, as has been imagined, from snow-water: certain it is, there is no snow here to occasion it."

The Sumatra factory records relate that three small bags containing samples of ginger, turmeric and coffee were sent back to England in 1767, and that although cardamums were another natural product which grew wild they had been unable to dispatch any as "the season for gathering being lapsed before we received your Order." They reported that "It is with much concern that we acquaint you that above 120 Pecools of Cloves have been brought here this Year by Eastern Praws. This disappointment is owing to the Vigilance of the Dutch, who last year fitted out a Fleet to attack the Island Ceram, from whence they are brought and were so successful as to destroy about forty vessels that were loading there, of which 15 belonged to the People of this place. We are afraid that the pleasing hopes of continuing and increasing this branch of Commerce may meet with such obstruction as we are unable to remedy."

London had also been enquiring about the possibility of cultivating cassia, to which Sumatra had replied that the trees were mostly confined to the hilly areas which lay outside their jurisdiction and that a European would have to be sent there.

In spite of Miller's belief that Marlboro' was healthy he was forced in the September of 1771 to request permission to proceed to the north for reasons of health. This was granted and he was requested to inspect the Company's cassia in the godowns, and then "to explore the products of the countrys adjacent to Nattal and Tappanooly and particularly to examine the Cassia Tree and observe its method in curing. . . ."

Charles Miller was of the opinion that the cassia in the godowns of Tappanooly was decayed owing to long storage and "in the greater part destitute of Aromatick quality and not fit for the Europe market. On further looking at it closely he found it adulterated with a mixture of Bark of some other trees." Accordingly it was sold off to a Mr John Herbert at five dollars a pecul.

Miller then made an arduous journey into the Moosee country and sent back a clear and careful report. "I left Marlbro' September 29th. and proceeded to Benteren. At this place I observed some plantations of Coffee trees. The Coffee produced here (altho' used at Marlbro') is so inferior in Quality to the Arabian Coffee as to be by no means fit for the Europe market, the which I apprehend to be entirely owing to the want of skill in the management of it, the Plant being undoubtedly of the same species as that which is cultivated in Arabia.

I observed that the trees are planted so exceeding close to each other and are so much over-shaded by other taller trees that the sun cannot penetrate thro' them, to the Fruit, for that

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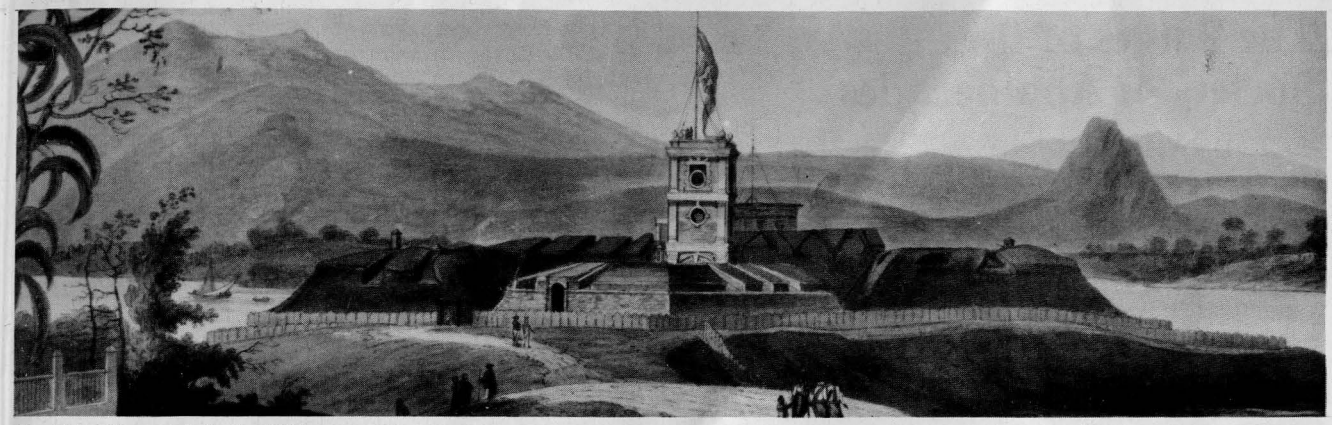

Fort Marlborough in the 18th century

its Juices are not well ripened and therefore it does not acquire a proper Flavour. Add to this that the Berries are not gathered here while red, which is before the degree of maturity, which the Arabs always permit theirs to attain to before they collect them and which they esteem so essential to the Goodness of the Coffee."

"From Benteren we proceeded next day to Paggar Addin, between these two places great Quantities of the Costus Arabicus and Amomum Zerubel grow wild.[1] The Malays, also used the Costus Roor medicinally: when dried. . . . At Paggar Addin I saw some Silk Worms, which the Malays feed with the leaves of a tree they called Krāton; this seems to be a species of Mulberry by its Manner of growth and foliage; I have since observed this tree, planted in small quantities at almost every Dooson I have been at. At this place I also observed small plantations of the true Ginger and was shown some of the dried root which was very good."

"At Cadrass I saw some pretty large plantations of the Indigo plant. The Malays make use of this Plant for dying but do not understand the method of preparing it in a proper manner so as to render it fit for exporting to Europe. At this place I also observed some plants of the Cotton. In the Banks of a small Rivulet . . . I observed great quantities of a Fossil, greatly resembling Coal, this (I have since been informed) has been formerly collected on the sides of the river near Bencoolen (to which place it had probably been carried down by Floods) and brought to Marlbro' to mix with European Coals or Charcoal for the use of the Smiths."

"In the woods near Goonoang Rajah I saw tracks of elephants which we were informed are sometimes in great numbers in the country. At Goonany Ayoo I observed some trees of the Bixa, which is here called Cossoombar, the Arnotto, a very valuable Dye which is imported into Europe from the West Indies, is the produce of this tree.[2] In the woods between Kalindang and Iambo I was shown a great number of the trees from which the Dammar is collected.[3] and also some trees called Oobar the wood of which is very red and is used for tanning. This wood greatly resembles the Logwood. . . ."

The party then climbed over the hills and at the first village they came to, Caloobar, they saw plantations of tobacco. Miller thought a fine product could be obtained if only the local people knew the proper method of curing it. He found a gum exuding from a tree known as the Patty Tree which closely resembled Gum Arabic and felt it could be nearly as good as the parent trees were in the same genus. The chief of the village showed him samples of sulphur which they collected in great quantity and carried to the Dutch at Palimbang for sale.

It was at Parahmoo that he had expected to see the woods of cassia trees but was told that they were still two days journey distant and in any case it was not the right season for cutting the cassia. Usually the people went in a large company and built themselves huts as there were no houses nearer than the village, but now the rains had set in the woods were far too damp and there would be nobody there. His guides were apprehensive that the roads would any day become impassable and advised him to return over the hills whilst he could.

In 1771 the sugar cane plantations were reported as being in excellent condition, as were the sugar and arrack factories, but the pepper gardens seem to have been the most important enterprise. On 14 November 1772 Edward Coles reported that when he had taken over his residency in November 1766 it only produced 637 cwt. 3 qts. 14 lbs. of pepper and the vines amounted to 753,701 but that since last January alone he had received 3,338 cwts. 3 qts. and that the vines had increased by 623,748, making a total of 1,377,449. He went on to write, "I have the additional pleasure to observe that the natives have no other stimulant than their own Industry: there not being a single planter brought down for Punishment the last Survey for neglect. When inclination is substituted in lieu of compulsion there is no manner of doubt of success."

Pepper, ginger, cassia, spices dating back to antiquity, no wonder the island of Sumatra was fought for by contesting Europeans, and the English must have been reluctant to forego their share in its fruitfulness.

References

1. *Costus* synonyms, Kunth, Kuth or Koot root.
   It is obtained from Saussurea lappa, N.O. Compositae. In powder form it was used for preserving furs etc. from moth, and the oil as a basis for perfumes. The liquid extract was once employed in asthma.
2. *Annatto*
   This dye is obtained from the dried pulp of the fruit of Bixa orellana, N.O. Bixaceae. It grows naturally in tropical America and the West Indies but was widely cultivated in Asia and Africa.
3. *Dammar*
   East Indian Dammar is obtained from various species of Shorea, Hopea and Balnocarpus, N.O. Dipterocarpaceae. It is used in varnishes.

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The Barges of the Society of Apothecaries

by T. D. WHITTET

The Worshipful Society of Apothecaries of London became an independent City Livery Company or Gild in 1617 when the Charter of James VI of Scotland and I of England separated them from the Grocers' Company of which they had been an autonomous section for centuries.

The Grocers' Company, which had assumed that title in 1373 and which gained its first Charter in 1429, had developed from the Fraternity of St. Anthony, formed in 1345. Among the Fraternity's ordinances was that "No person shall be of the Fraternity if he is not of good condition and of this craft, that is to say, a Pepperer of Sopers Lane or a Spicerer of the Ward of Cheap, or other persons of their Mystery wherever they reside." At least one founder of the Fraternity is known to have been an apothecary and two others probably were.

The Pepperers' Gild from which the Fraternity was formed was first mentioned in the Pipe Roll of 1180 when it appeared as the Gilda Piperarorium among eighteen "adulterine Gilds", so called because they had not purchased from the Crown the right of association. They were amerced for a fine of 16 marks and presumably paid it and became officially recognised.

There is ample evidence that the apothecaries were members of the Pepperers' Gild and "Wardens of the Apothecaries" have existed since at least 1328.

The newly independent Society of Apothecaries did not obtain full recognition by the City of London until 1630. In that year the Society's rank and rating were settled by the Common Council and the right to have a Livery was granted by the Court of Aldermen.

All the members of the Court were forthwith invested with the clothing and proceeded with the aid of Past Masters to prepare a list of members to be called to the Livery. The thirty-six persons so chosen were summoned "to attend in their gowns and to bring with them their hoods to the end that the Master might invest them into the Livery according to the ancient custom of other companies."

To mark its full civic development the Lord Mayor summoned the Company to attend him at St. Paul's on Christmas Day and after the sermon went "with the Aldermen and their attendents, and in a most noble and courteous manner saluted the Company."

Proud of its formal recognition the Company decided to play its part in the civic pageantry of Lord Mayor's Day.

The first mention of a barge came on August 19, 1631 when "Alsoe proposition being made about the buying of Streamers and banners for the Company the managing of that business is referred to Mr. Warden Hicks, Mr. Cooke, Mr. William Bell, Mr. Stone, Mr. Fothergill, Mr. ffeild and Mr. Shambrook or any 4 of them and the Clerke is to be called to thyre meeting. Alsoe they are to agree for all preparation for a Barge and other things against the L.Maior's Daie."

On August 29 the Committee had a meeting about the "provision of Banners and streamers for the Company and provision of a Barge and oares attending that Daie. Att wch tyme one Mr. Tailor did undertake to provide 3 banners one with the Kings Armes, another with the Cittie Armes, the third with the Companyes Armes and two long streamers with staves to beare them and Rowling Staves and papers to wrapp them in and to paint the bearing staves for wch. he is to have XXXVIII^{lb}. And into the bargain he is to mend the patent of the Companyes Armes if there be any defect of Heraldrye."

John Tailor (Taylor) was an original member, being mentioned in the Charters of 1614 (which had confirmed the apothecaries as a section of the Grocers' Company) and 1617. He was apprenticed to Richard Sheppard and became free of the Grocers' Company in 1588. He died in 1632.

At the same meeting "Athanasius Whyniard a waterman did agree to find and provide for the Company on the Lord Maior's Daie a decent Barge to carry 50: at the leaste and to provide oares and steeresman and herbes and rushes and to fetch the streamers and cushions to and from the Barge and find themselves their breakfast for wch. he is to have iii^{lb} x^{s}." The account book recorded at the same time some additional expenses—Music cost £1.10.0, Ribbon for the Members £2.6.0, a Barge Cloth 5/-, staves for the "young men" and boat hire for them 6/-.

Stewards were appointed to provide dinner on the day, receiving 2/6 from each Liveryman towards the cost.

The "young men" or "bachelors" were ordered to come "well and decently apparelled" and "to take the colours". These young men were sometimes apprentices, new members or the young sons of members.

The Company met at 8 a.m. at the Mitre in Broad Street as it had not yet acquired its own hall.

Year after year the programme was repeated and the accounts showed but little variation in the expenses. In 1634 trumpeters were engaged at a cost of 2/6 and in 1645 74 yards of ribbon were bought for £3.

After some years the use of a hired barge was thought inconsistent with the dignity and prosperity of the Society. In 1658 subscriptions were invited for the building of a barge but owing to demands made on the Company at the time of the restoration and the reception of King Charles II by the City, the scheme was not developed. On October 4, 1654 Thomas Hodshon was appointed a barge man at the 4^{lb} rate and in 1660 a barge was hired for £5.10.0 but this included a supply of "light horsemen" (i.e. small boats or gigs).

In 1664 the Society discussed with the Surgeons a proposal for sharing a barge house, but the negotiations soon came to an end because the Society was called upon to lend £1,000 towards the £10,000 advanced to the King. The Surgeons had asked for £298.18.11, besides the glazier's bill and the printer's bill, for half their barge house. The Society had "to return all thanks to the Company of Surgeons" and to reply that "they should be very glad if they could conveniently join with them but the intervening accident of the loan of £1,000 had so put them out of stock that they could not at present think of providing a barge."

In succeeding years came the Great Plague and the Fire which destroyed the Society's Hall. It was rebuilt between 1667 and 1671 at considerable expense to the Society and its members who subscribed generously.

In the early 1670s the dispute with the College of Physicians flared up again in the form of a pamphlet war started by Christopher Merrett's book "A Short View of the Frauds and Abuses Committed by the Apothecaries", and in 1673 the Society's Chemical Laboratory was founded so it is remarkable to find that the first barge was obtained in that year.

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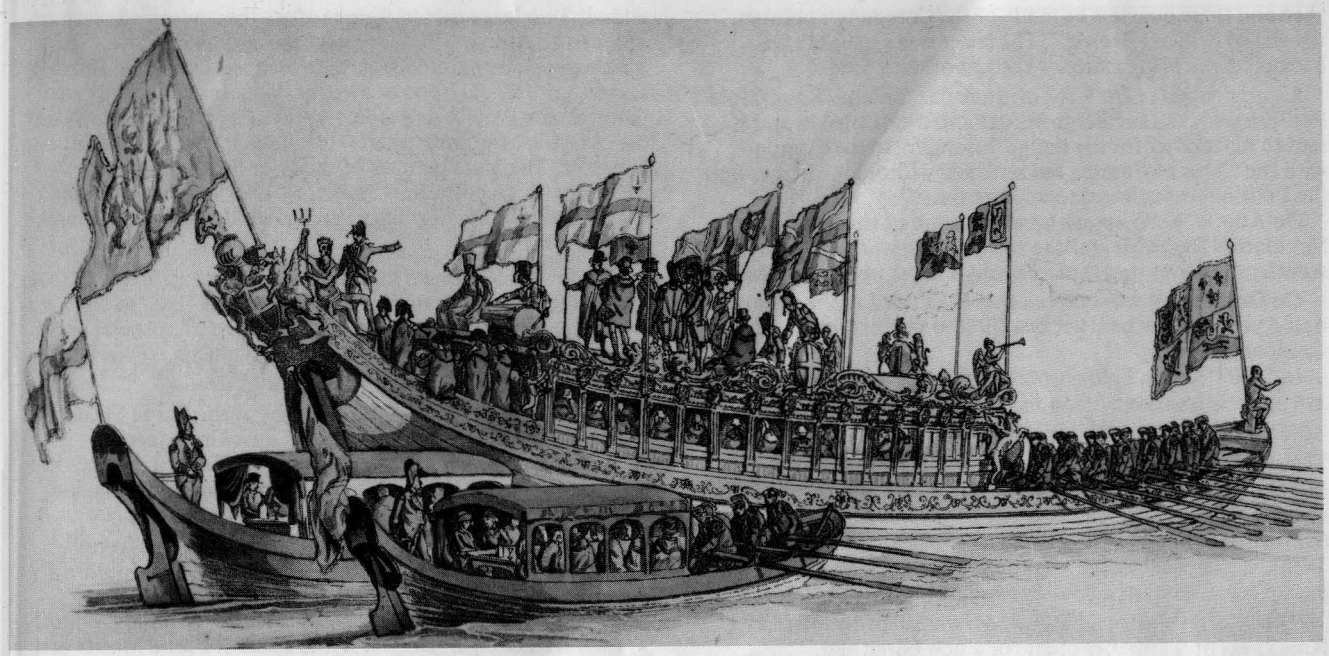

Fig. 1. The Lord Mayor's Barge

Courtesy Guildhall Library London

The first barge

In 1673 the Court was informed that on the previous Lord Mayor's Day several members "ashamed of the meanness and inconvenience of a hired barge had started a subscription for the building of a new one and the purchase of a barge house."

The scheme was approved and a committee was appointed to carry it into effect. In July 1673 the estimate submitted by Nicholas Wheatley was accepted: he was, for a sum of £110, to build a barge similar to that which he had supplied to the Mercers' Company.

The contract is still in existence but is too long to transcribe here. Wheatley undertook to provide all the materials and work necessary for the building and equipment of the barge "with oars and forms and benches in the house or covered part thereof", according to "the model, frame and dimensions and as large and good in all respects whatsoever as the barge lately built for the Company of Mercers of the City of London now is or was at the time of the building and finishing thereof and to differ nothing from the barge save only in some extraordinary carved work, as instead of the Maidenhead, the said Mercers' arms, two unicorns to be carved in good oak or elm timber and one on each side of the door into the house of the said barge and a Rhinoceros carved in like manner and set over the same entrance and also the coat of arms of the Company of Apothecaries with the supporters and crest well carved in like manner and set at the stern of the barge with screws to take off and on."

The painting and gilding was not included in the contract but was to be done at the Company's own charge. Mr. Cleere who had done the carving on the Mercers' barge was to do the carved work and no other person.

Unfortunately no paintings or drawings of any of the barges remains but Figure I shows a picture of the Lord Mayor's Barge. The Society's barge would have been slightly smaller but of the same type. There is no doubt from the description that it was a handsome and impressive vessel.

There was some difficulty in finding a site for the barge house but at Michaelmas 1673 a lease for 61 years of some three acres of meadowland on the river bank at Chelsea was obtained from Charles Cheyne (afterwards Viscount Newhaven) at an annual rent of £5.

The land thus acquired was much more extensive than was required for the barge house and through the enterprise of the members of the Society was developed into the famous Physic Garden.

Having obtained the site the Society learned that the Tallow Chandlers Company and the Weavers company were also seeking barge houses.

The Tallow Chandlers were granted a lease for 51 years of a double plot adjoining the Society's barge house at a ground rent of £3 p.a. and a fine of £10. The second house was sublet by them to the Weavers. The position of the barge houses is shown in Figure 2.

In 1675 Thomas Lambkin was appointed the first Barge Master at a salary of £4 p.a. The inventories of 1676 and 1677 show that he and his mate were each provided with sashes, shoes and stockings, a silk waistcoat and breeches. The eighteen watermen wore the Company's coats and caps with cravats and ribbons.

There are many subsequent references to the payment of £3 to the Barge Master for a suit of clothes. The fact that this sum did not change over a period of about 100 years shows the lack of inflation in those days.

The barge was used not only on Lord Mayor's Day but also for the "herborising excursions"; in 1678 an order was made by the Court that the barge should be at the disposal of the young members of the Company to bring them back from Fulham to Black Friars Stairs after herborising. Later that year, at the time of the Popish plot, it was used to take soldiers down the river to the ships and afterwards Wheatley was instructed to examine it and report whether any harm had been done to it.

On September 24, 1682 a cradle was ordered for the barge and £20 p.a. was offered to Lambkin "to keep the Barge in constant repair for the ffuture and to put itt in repaire for the psnst. and offer sallary and allowance wch. Mr. Lambkin accepted." At the same time it was ordered that a "Coat of

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yard and three quarters be made of the Company's colours, the gift of William Brown." The latter was a member who became the first Treasurer of the Laboratory Stock.

Lambkin died in 1685 for on June 25 "Thomas Lambkin's Petition was read for Barge Master and then called in and sent to his mother for the Badge belonging to the Company with the Company's arms but returned without it whereuppon the Petition was referred to another time."

On August 20 "Thomas Lambkin sonn of the late Barge Mr. elected Barge Mr. for the year ensuing who is to give xx^{lb} security to deliver upp the Company's Crest upon demand."

On October 8 it was ordered that "Widow Lambkin have half a years sallary paid her but ffirst to wax and tallow the Companies Barge."

In 1698 "certain bold enroaching trumpeters" received 2/6 and the Assistants "coming from the water wet, called for a pottle of sack costing 2/4."

The second barge

In 1713, after 40 years service, the barge was reported to be old and decayed. The Goldsmiths' barge was said to be for sale but the result of enquiries seems to have been unsatisfactory. Two years later the barge was found to be past repair and was put up for sale but a purchaser was not found.

"The Barge Master's salary of 4^{lb} was suspended from Xmas next untill further orders or a new barge had."

On October 20, 1717 "the Master proposed to the Court to sell the Barge ye same being wholly incapable of service. Mr. Siddall acquainted the Court that he had been bid £5 by one Mr. Plunkett. Ordered that it be left to Mr. Siddall to sell the Barge at £5 and so much more as he can get." It appears that Mr. Plunkett backed out of the deal as on March 13, 1718/9 "Mr. Sidall made his report as to ye Barge that in pursuance of last Court of Assist . .ts had Endeavoured to Sell it but coud get nothing Considerable and was Advised it would be best to Keep ye Same and that the Material may be of Service on Building a new Barge."

Before a new barge was obtained Thomas Lambkin (2) died in July 1724 and was succeeded by his brother George who was to be "Imployed in the same manner his brother was but there being no Barge no sallary is at present allowed." George did not hold the post for long as on March 25, 1724/5 "The Petitions of the nephew and brother of George Lambkin deceased for the place of Barge Master was read. And the Company having no Barge and consequently no occasion for a Barge Master. Ordered that James Lambkin the brother be the person Imployed when the Company shall have need for a waterman."

It was not until 1727 that the Society decided to build a new barge. Voluntary subscriptions amounting to £344 were received and an agreement was reached with John Hall, a shipwright, to build it "to the satisfaction of Mr. Hilliard, the Society's Carpenter" for £230.

The estimate of John Goodyer for painting and decorating the barge has been preserved and gives a word picture of its appearance.

The inside of the house, being wainscot, was to be varnished, the great carved shield gilded and painted in proper colours, the carved trail boards gilded on each side. The waist board was to be ornamented with the King's, the City's and the Company's arms and crest, there was to be a handsome foliage fore and aft of the saxboards: the great ogee of the cornice round the house, and beads round the saches and ornaments between the pillasters to be gilt; the fluted pillasters with Corinthian Chapiters and bases, the beads round the pannels and fore bulkheads and beads round the doors all to be gilded. Two large carved figures afore the house and two ditto abaft to be gilded. The four lower pannels of the fore bulkheads to be painted with figures representing the four seasons of the year. The two upper pannels of the fore doors painted with Apollo and Aesculapius. The pannels of the two doors of the after bulkheads to be painted with Hercules and Industry. The great pannels of the after bulkhead to be painted with Neptune and Thetis in a chariot drawn by sea lions. A dolphin to be painted on the rudder and a maskhead on the transom.

The thwarts, timbers, lockers, oars and all utensils of a plain red and the thwarts and oars numbered. The floor to be of a chocolate or other plain colour. The cost of all this elaborate decoration was £47. The resulting vessel must have been a very impressive and colourful one.

The crew of the new barge consisted of the Barge Master James Lambkin, the Mate Thomas Lambkin Jr. and 18 watermen of whom Thomas Lambkin Sr. headed the list. The watermen held their posts "during their good behaviour and until removed therefrom by an order of the Court."

On Lord Mayor's Day 1727 only the subscribers were allowed to use the barge and in recognition of their generosity a list of their names was put up at the Hall and they were allowed to have the use of it "once a year or twice at the most at their own charge" subject to the consent of the Master and Wardens.

Mr. Ralph Forster (a member of the Court; Master 1732/3) was given a piece of plate to the value of 10 guineas "for the great care and pains by him taken in procuring and to settling the subscriptions for the Barge" and Joseph Hill the Beadle was given 4 guineas for helping him.

A wharfe

Also in 1727 an order was made for a wharfe to be erected at the Garden at a cost of not more than £1,000. The sum was raised by loans from the members at 4 per cent interest. On August 28, 1728 it was ordered that the Barge Master's salary shall commence from Michaelmas last and that Mr. Renter Warden pay him what remuneration is due to him."

By that time he was very advanced in years and petitioned along with his son Thomas (3) that the latter should succeed him, he offering "that his father shall receive the Sallary of Barge Master as he should have." The Court agreed and Thomas (3) was appointed in accordance with the petitions.

The barge continued in regular use but was seldom mentioned in the minutes. In 1728 "a Scarfe' was bought for the Barge Master and "ribbands" for the watermen.

In 1739 the Barge Master was to have a new suit and the barge was to be washed; on August 25, 1746 the barge house was to be repaired under the direction of Joseph Miller, the Praefectus Horti.

In 1749 the Master Nathaniel Green, without first obtaining the Court's permission ordered a "Band of Musick" for the Barge going to and coming from Putney on Herborising Day. He asked the Court's forgiveness and the Court agreed to pay the cost "but this not to be a President (sic) for the future."

On July 14, 1751 the Court "Read the Petitions of William Clarke, John Green, Thomas Lambkin, cousin of Thomas Lambkin deceased, Charles Shepley, Francis Barrell Searle and Thomas Shilds, severally praying to be chosen Barge Master to the Society in the room of the said Mr. Lambkin deceased." Clarke was elected and thus ended the Lambkin dynasty of Barge Masters which had lasted 78 years.

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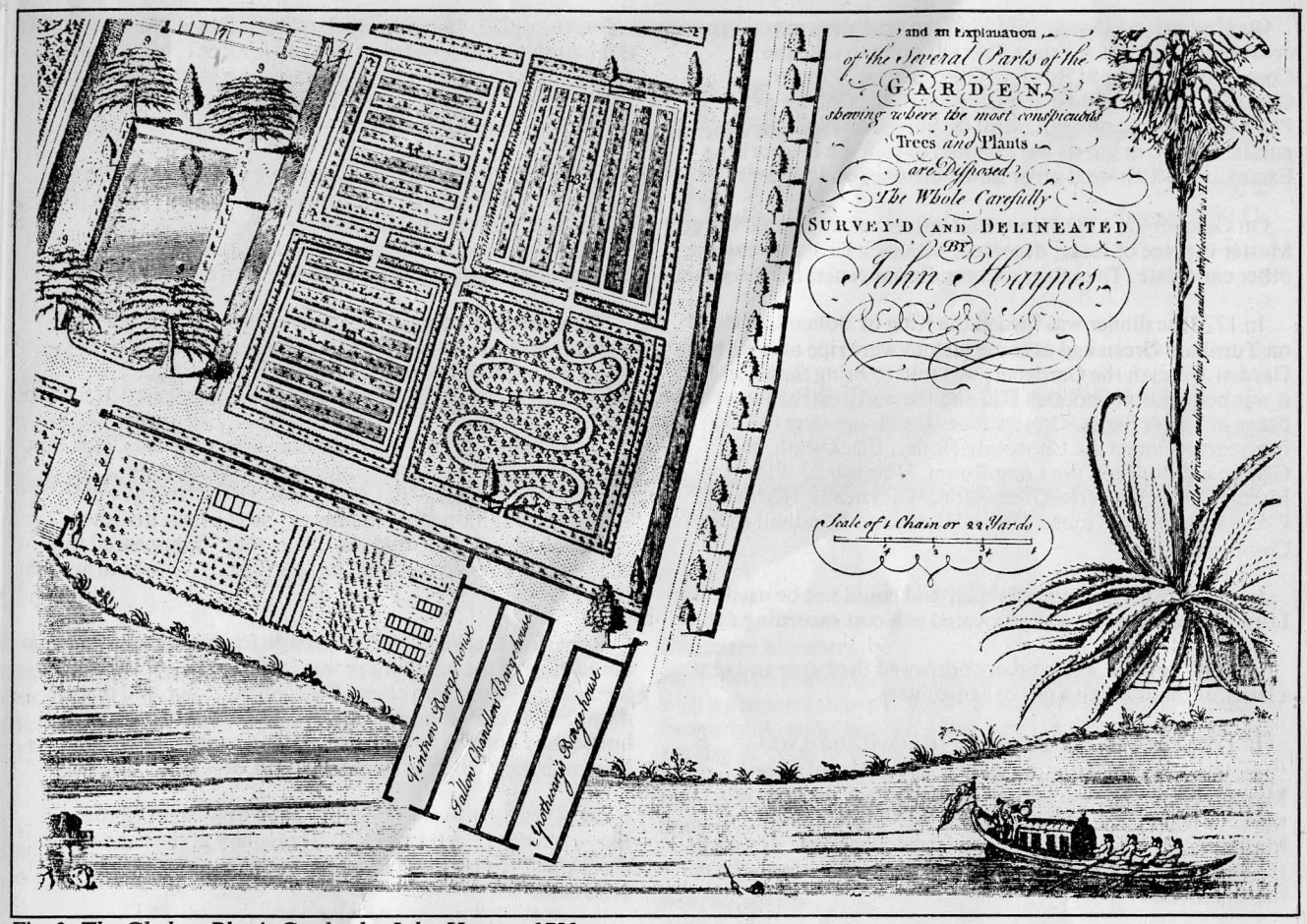

Fig. 2. The Chelsea Physic Garden by John Haynes, 1751

On October 10, 1753, it was "ordered that the Barge do not go out on Lord Mayor's Day she wanting as the shipmaster says considerable repairs." A year later a committee reported it was "not near so bad" and "Mr. Miller and Mr. Elderton (at whose yard she was built and repaired ever since)" were asked to see whether "she might not at a small expense be made to serve several years longer." Miller was prepared to repair her for £9 and to keep her in repair for 7 years for £7 p.a. Elderton's quotations were £10 and £8 p.a. respectively so Miller's terms were accepted.

By 1758 further repairs were required and Miller asked 14 guineas for covering the top of the barge (presumably of the house) which was not watertight. The repairs were effected and the barge used at the herborising excursions in July 1758.

In 1761 the barge was repainted and a new set of colours was bought, apparently the old colours purchased in 1631 were at last worn out. The new colours were:—

1. The Standard or King's Arms.
2. The Company's Arms with Crest and Supporters.
3. The City's Arms with Crest and Supporters.
4. The Company's Arms without supporters in a Compartment.
5. Two Streamers with the City and Company Arms of proper ornaments.

They were made by John Stock & Co., and cost £48, the Society providing 23 yards of crimson mantua silk at 9/- per yard and 17 yards of blue at 8/- per yard bought from Messrs. Palmer & Fleetwood.

The third barge

During March 1764 the barge, now 27 years old, was found to be past repair. Charles Cowndell, who had made by far the lowest tender, agreed to build and finish the new barge with proper images and ornaments, to the satisfaction of Mr. George Bowman the Company's surveyor, for £640 finding all the materials, carving, painting and gilding but not providing the plate glass.

On this occasion the cost was not defrayed by voluntary subscriptions. The Society sold £780 of bank annuities to meet the expense.

On November 27, 1764 "the position of Barge Master to the Society being vacant by the removal of Mr. William Clarke the Court agreed to proceed to an election." John Jenkins and Isaac Ballantine applied and the latter was chosen. The salary was to be the same and the provision of suits of clothes was regularised, £3 being allowed every 5th year. No reason was given for Clarke's removal and he was the only one of the ten Barge Masters to be dismissed. If it was for misconduct the Society might have been better to have appointed Thomas Lambkin (4) in view of that family's long service.

The new barge was ready in 1765. The Master's seat was covered with "crimson stuff damask" and an "occasional footstep" was provided for him. Cushions were ordered for the use of the Company. Mr. Bowman, the Society's surveyor, presented to the Society a drawing of this barge which was framed and glazed and hung in the Hall. Unfortunately it has disappeared.

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On Herborising Day in July 1766 the new barge was ordered to be at Black Friars Stairs at noon to take the Company to dinner at Bowling Green House, Putney Common. The President and Censors of the College of Physicians and certain botanical enthusiasts were invited as guests. Each year guests were invited to join the Herborising Excursions which went up or down the river on the barge.

On October 22, 1772 Henry Ballantine was appointed Barge Master in place of Isaac, deceased, Meshack Croker being the other candidate. The salary and conditions remained the same.

In 1777 the dinner was held at the King of Bohemia's Head on Turnham Green and as some melons were ripe at the Physic Garden, Forsyth the Gardener, was told to bring them. In 1778 it was held at Bull Shooters Hill and the party embarked in the barge at Tower Stairs. Other venues for dinner over the next few years included the Chocolate House, Blackheath, the George and Vulture, the Long Room, Hampstead, the Mermaid, Hackney, the Green Man, Blackheath, Highbury Place, Canonbury House, Grove House and Windmill Row, Camberwell.

In 1786 the barge required repair and could not be used on Lord Mayor's Day. It was renovated at a cost exceeding £163.

In 1791 the Salters' Company borrowed the barge and sent a letter of thanks with a gift of ten guineas.

In 1797 a new set of colours was required and it was "resolved that the Barge do not go out on the next Lord Mayor's Day by reason the colours could not be ready in time." They were ready by the next year and the Barge Master was given a new Livery and a gold laced hat to match the splendour of the colours. This set of colours now hang in the Great Hall.

As in the case of the second barge, the third became decrepit after 37 years. In 1802 it was thought to be unsafe for conveying the Herborising party to Greenwich. It was repaired at a cost of £255 and the next year it was found that during the Spring tides it had received damage from friction against the gates of the barge house. Mr. Fairbairn, the head gardener was "desired to call on Mr. Sheppard, Water Bailiff, to ask his advice about throwing out the gate 1 or 2 feet that thus lengthening both the Barge might be prevented from receiving injury . . ." In the same year the Lord Mayor's Secretary wrote to ask for "The Resolution about Watermen to be carried into effect." The Barge Master was ordered not to employ anyone who did not comply with the resolution.

On March 3, 1803 "John Babington was chosen Barge Master in room of Henry Ballantine, deceased."

In 1805 the Court of Aldermen sent a special request to the Livery Companies to attend in their Barges at Greenwich to take part on January 8, 1806 in the funeral of Admiral Lord Nelson. On the day before the funeral Nelson's body was brought along the river from the lying-in-state at Greenwich to Whitehall with Barges as escorts.

It must have been a spectacular and colourful occasion and perhaps the climax of the Society's participation in the Lord Mayor's Civic processions on the river.

On August 25, 1806, the Society's last Barge Master George Babington was appointed to succeed his late brother. In 1807 the "youths to support the colours" were Masters Richard and William Collier, James Wheeler and Philip Hurlock, presumably sons of members.

In 1809 and in several subsequent years the Lord Mayor invited the Society to go in its barge with the City party to Richmond, but the invitations were regretfully declined "because so many members were prevented by their professional engagements from taking so long an excursion."

The use of the barge on herborising excursions and possibly on Lord Mayor's Days continued but with the Society's added responsibilities after the passing of the Apothecaries Act of 1815 interest in civic pageantry decreased.

On January 28, 1817 "The Master informed the Court that the Barge was in ruinous condition and full of water." Mr. Roberts the barge builder was asked to "report on her state and condition and the sum required to put her into thorough repair." He told the Court that "It appeared that the necessary repairs and Beautifications . . . would amount to £329."

Roberts was asked to sell the Barge for the best price he could get and the bargehouse was let to Mr. Lyall of the Swan Brew house who closed the river entrance and opened a window overlooking the Garden. The other two barge houses had been let to the Goldsmiths Company and their lease was renewed in 1823 at a rent of £20 p.a.

On April 4, 1817 the Society made a "payment to the Barge Master £2.3.0 and £1.10.0 his salary at the time of his discharge." In 1818 some glasses belonging to the barge were sold.

Finally in 1874 the construction of the Chelsea Embankment cut off the Garden and the barge houses from the river and on December 1 of that year the barge houses were reported to be dilapidated and were recommended to be demolished. The Society decided not to do so because of possible objections at a time when it was considering giving up the Garden which, in 1899, was transferred to a Committee of Management under the London Parochial Charities. The Society of Apothecaries and several other learned bodies including the Pharmaceutical Society are represented on the Committee.

The only remnants of the barges are the four flags and two streamers in the Great Hall and a carved wooden plaque above the fireplace in the Court Room. It bears the date 1691 and the initials I.G., those of James Gover, Master in that year and the inscription "Altissimus De Coelo Creauit Medicinam," a variant of part of Ecclesiasticus Chapter 28, Verse 4 "The Lord hath created medicines out of the earth." Some brickwork of the barge houses remains at the Garden and forms part of some of the outhouses.

This article is partly based on a manuscript of Dr. Cecil Wall, Master of the Society 1932/3 and Archivist to the Society together with a thorough search of the Court Minute Books.

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PHARMACEUTICAL HISTORIAN

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Contributions to the Editor: Arthur Wright F.P.S., D.B.A. · 36 York Place · Edinburgh · EH1 3HU

British Pharmaceutical Conference

Details of the history session being held during the British Pharmaceutical Conference in Newcastle-upon-Tyne on the afternoon of September 18 are as follows:

2.15 p.m. Mr. W. A. Campbell, MSc, FRIC, Dept. of Inorganic Chemistry, The University, Newcastle-upon-Tyne, "The Copperas Trade of Tyneside.
3.15 p.m. Tea.
3.30 p.m.—5 p.m. Councillor William W. Pope, Newcastle-upon-Tyne, "A Photographic Journey on Hadrian's Wall".

Members wishing to attend the session should get in touch with Mrs. L. Cameron, honorary secretary, at 36 York Place, Edinburgh EH1 3HU.

Third Foundation Lecture

Members of the Society and their guests thoroughly enjoyed the hospitality of E. R. Squibb & Sons Ltd. at the Third Foundation Lecture on March 13. The company's continued support for these annual lectures is very much appreciated and the Foundation Lecture is now an important feature of the BSHP calendar.

Spring Conference

The Bradford conference was voted by many as one of the more successful Spring Conferences. Abstracts from the papers are to be published in a future Pharmaceutical Historian but meanwhile the committee wish to record their thanks to Winthrop Pharmaceuticals, who were responsible for the Friday evening dinner, and to Sandoz Products Ltd., who sponsored the function on Saturday evening at East Riddlesden Hall.

Pharmaceutical Historian

This larger than usual issue of the Pharmaceutical Historian includes the Foundation Lecture given by Dr. J. R. Vane. The society acknowledges the generous sponsorship of the Wellcome Foundation Ltd., which has made possible the publication of this issue.

Honorary Members

At the March meeting the committee unanimously agreed with a proposal that Mr. R. G. Todd and Miss D. A. Jones, formerly librarian and assistant librarian, Pharmaceutical Society of Great Britain respectively, be made honorary members of the BSHP. The honorary membership certificates were presented by the President, Miss D. A. Hutton, at the annual general meeting on March 29.

New Members

Mrs. B. Dilley	Richmond, Surrey
Miss C. Evans	London
Dr. F.Lederman	Switzerland
Mrs. T. M. McGuckin	Ridinghill, Northumberland
T. T. Macadam	Harrow
J. A. Myers	Edinburgh
J. F. O'Mara	Newfoundland
R. Sinclair	London

Officers

At a meeting of the committee of the British Society for the History of Pharmacy held on May 22 the following office-bearers were elected:

President:	Mr. A. Wright
Vice-President:	Dr. W. E. Court
Joint Secretaries:	Dr. T. D. Whittet
	Dr. W. E. Court
Treasurer:	Mr. J. C. Bloomfield

A new member of committee was also elected (to fill a casual vacancy): Mr. T. T. Macadam.

The full committee is:
Dr. V. Berridge (co-opted), Mr. J. C. Bloomfield, Mrs. J. Burnby, Dr. W. E. Court, Dr. M. P. Earles, Mr. B. Hardisty (co-opted), Mr. D. A. Hodgson, Miss D. A. Hutton, Mrs. A. Lothian Short, Mr. T. T. Macadam, Mr. A. G. M. Madge, Mr. L. G. Matthews, Dr. T. D. Whittet and Mr. A. Wright.

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The Third Foundation Lecture

The Research Heritage of Henry Wellcome

by Dr. J. R. VANE FRS

The founders of Burroughs Wellcome & Co., forerunner of The Wellcome Foundation Ltd., can justly claim to have been the architects of modern pharmaceutical manufacturing and pharmaceutical practice in the United Kingdom. Both men, Silas Burroughs and Henry Wellcome, graduates of the Philadelphia College of Pharmacy, introduced to Britain products of an advancing technology in the United States—tablets of precise dosage and gelatine-coated capsules. These were to have as profound an effect on the dying era of the pill, potion and pestle as the micro-chip is making in electronics today.

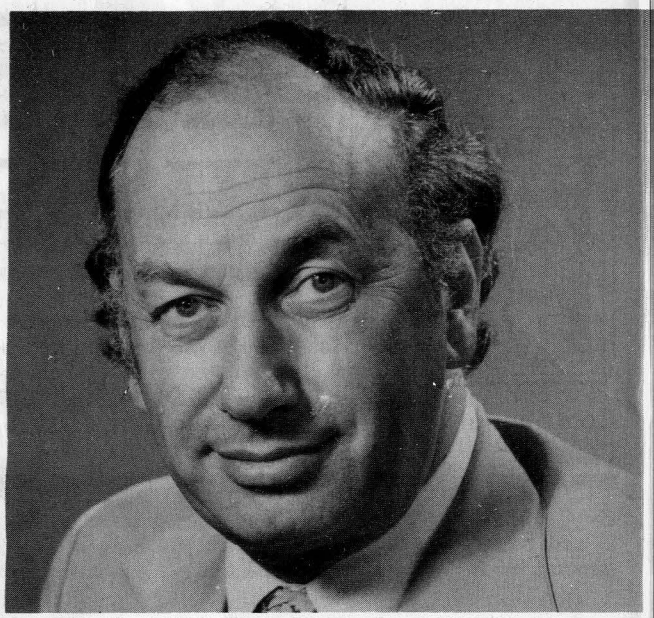
Burroughs was the first to arrive in London, in 1878, representing the well-known pharmaceutical company, John Wyeth & Brother. He terminated the appointment the following year to start his own business as sole agent for Wyeth. To expand his range of products, Burroughs sought a partner who could introduce new agency work. He found the man in Henry Wellcome, who had established himself as the most successful representative of McKesson & Robbins, the largest American wholesale drug house. The partnership was signed in London on September 27, 1880.

Burroughs brought to the business a flair for salesmanship and a restless desire for travel that were harnessed to establish agencies and business not only in Europe but also in the Middle East, India and Australasia.

Wellcome contributed talents that were far richer and more varied. As early as 1869, he advertised his first product, a "magic ink". Before his arrival in England in 1880 he had established a reputation as a young active member of the American Pharmaceutical Association. In 1874 he published his first paper in the American Journal of Pharmacy entitled "Chlorinated Alkalies as a test for Morphia". In 1877 he delivered a paper on "The Bromide Production of the United States" at the Association's Toronto meeting. And in 1879, following a marathon tour, often by mule, of Central and South-America, as far south as Lima, he published a paper in the Pharmaceutical Journal of Great Britain on quinine, the active constituent of cinchona bark, and how it could be produced.

These essays into scientific research were harbingbers of Henry Wellcome's primary contribution to the pharmaceutical industry and the pharmaceutical profession—his recognition of the cardinal importance of scientific research in pharmacy as an aid to human—and to animal—health. He said "I choose to spend my wealth in supporting research as another man might choose to spend his on a racing stable". No man did more to stimulate research in pharmaceutical chemistry or to apply the fruits of such research to specific problems of medicine.

In keeping with his practical nature, Wellcome first concentrated his scientific attention on perfecting the tablet.



Dr. J. R. Vane FRS, Group Research and Development Director, The Wellcome Foundation Ltd.

He recruited highly skilled engineers to devise special machinery for the production of compressed products to an unprecedented standard of precision and consistency. It was claimed that products from his machines could provide a range of dosage from one thousandth of a grain to 60 grains or more. With the increasing use of alkaloids and other highly potent drugs, his achievement was of prime importance. In 1884 Wellcome personally coined and registered the mark 'Tabloid', a combination of "tablet" and "alkaloid". The word, now so familiar and used in other contexts, was one of the few trademarks to find its way into the Oxford Dictionary as the property of a commercial firm.

The start of research

By the time Burroughs died, prematurely, in 1895, the firm had proved singularly fruitful. Now, as the one-man owner of the company, Wellcome began to give expression to the vision which guided him in founding his many research undertakings. In 1894 he had already founded the Wellcome Physiological Research Laboratories with the practical objective of producing large quantities of diphtheria antiserum. Forerunners of the Wellcome Research Laboratories at Beckenham, they were one of the first, if not the first, research laboratories established by a pharmaceutical company.

Two years later, Wellcome opened the Wellcome Chemical Research Laboratories and appointed as its director Dr. Frederick Belding Power, whose brilliant scientific potential Wellcome had noted as a fellow student at Philadelphia.

In 1901 he assured the research future of the physiological laboratories by obtaining, in the face of fierce opposition from the Royal Colleges of Physicians and Surgeons, registration of the premises in Brockwell Hall, Herne Hill, for experiments on living animals. No laboratory attached to a commercial firm had previously been so registered.

In 1904, Wellcome recruited Henry Dale to work in (and soon to direct) the Wellcome Physiological Research Laboratories. When Henry Dale, then at Cambridge, first

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received the offer from Wellcome, he hesitated over accepting it. "Friends to whom I mentioned this approach," he said, "were almost unanimous in advising me to have nothing to do with it. I should be selling my scientific soul for a mess of commercial potage." He accepted and had no regrets. I mention this because I had a similar offer in 1971, when I was a university professor. Although attitudes have softened (or perhaps people express themselves more discreetly), I also found amongst certain of my friends a resistance to the idea of me "entering the business world". It was as if to say that good science can only be performed in academia. Those friends were wrong; like Dale, I accepted and had no regrets. It was interesting that, with hindsight, the discussions I had with friends and colleagues at that time revealed a whole wealth of ignorance (in which I shared) of what research in industry is all about. One of my ex-graduate students, in fact, congratulated me on "taking over Dale's job", ignorant of the many Research Directors in between and the fact that Dale led a team of some twenty people, whereas I am now responsible for more than 3000!

Henry Wellcome offered his scientists freedom of opportunity to reach objectives relevant to his business, good facilities and liberty to publish their discoveries. He was one of the first to see that the future for an ethical pharmaceutical company lay in fundamental research in the basic sciences. From the detailed study of what happens and how and why, the drug discoveries would follow. Yet he in his lifetime saw a distinction between so-called commercial and academic research and to some extent tried to perpetuate it.

When Wellcome opened his Institute in London in 1932, it housed not only his historical collections but academic laboratories for the study of tropical medicine which were quite distinct and independent from his company's laboratories at Beckenham. The one was devoted to science for its own sake, philanthropically and without any ulterior interest. The other was organised, over however long a term, for the discovery of drugs that would provide new products for him to sell.

In his will, Henry Wellcome left the ownership of his company to charitable trustees with instructions that all profits that they received as sole shareholders should be applied to the support of medical and allied research in universities and teaching hospitals around the world. Not one of these grants may be made for the purpose of producing a discovery for the advantage of the company that they own. Yet in the years since Wellcome died, the distinction between academic and commercial research has largely melted away. Laboratories that study basic science *will* produce discoveries. Laboratories set up for innovation *must* study basic science. And indeed those "academic" laboratories in Wellcome's philanthropic institute later came out to join our main research laboratories simply because the work they were doing was the same.

Wellcome obviously chose well in Dale, who remained a practising scientist for most of his long working life. I particularly remember his attendance at meetings of the British Pharmacological Society and the Physiological Society well into his eighties. And from the front row, he would still ask the most pertinent questions after a scientific paper!

After the appointment of Dale in 1904, Wellcome's policies combined with Dale's flair attracted young scientists who subsequently achieved international recognition for their work. By 1914, in the Physiological Laboratories alone, there was a team of 12 exceptionally gifted young men, including A. J. Ewins, J. H. Burn and A. T. Glenny. It was this team, seven of whom became Fellows of the Royal Society, which, together with appointments in the Chemical Research Laboratories, first raised Wellcome research to international status. The time was ripe for the uninhibited enthusiasm and courageous enterprise of these scientists, not only to build upon the first tentative beginnings of the new therapeutics which had, with Pasteur, Koch, Ehrlich, Behring and a few others, marked the end of the nineteenth century, but also to open up new areas of scientific discovery.

If I may inject a personal note, I began my pharmacological training in 1946 with one of these men, Professor J. H. Burn FRS, then Professor of Pharmacology at the University of Oxford. It was his energy and inspiration that set my career into one of adventure in the fields of bioassay and pharmacology. Last year, The Wellcome Foundation Ltd. established "The Wellcome Gold Medal in Pharmacology" for the British Pharmacological Society and it gave me particular pleasure when the Committee of the Society awarded the first Wellcome Gold Medal to J. H. Burn, now in his mid-eighties.

Wellcome could not have foreseen the importance of the contribution which Dr. Power made as the first Director of the Chemical Research Laboratories. In 18 years' work, Dr. Power was associated with seventy-five scientific papers in chemistry, pharmacology and pharmacognosy. He made exhaustive investigations of the constituents of over fifty different plants. His most widely known research was concerned with the examination of the seeds of chaulmoogra, and the identification of two different ingredients. These had some success in the treatment of leprosy until replaced more than thirty years later by the first sulphone derivatives—also discovered in the Wellcome Laboratories.

If the name of Dr. Power is given special prominence, it is because he was to set a pattern of work and a standard of publication that were emulated by scientists in Wellcome Laboratories down the years. It is, therefore, not surprising that he played the major role in revising both the British and the American Pharmacopeias, nor that Wellcome scientists today sit on many committees where standards of quality and safety are being set for medicines.

Fundamental discoveries

At the beginning of the century, investigation into crude ergot was initiated at Henry Wellcome's suggestion and it was the team of Barger, Dale, A. J. Ewins and P. P. (later Sir Patrick) Laidlaw, which elicited not only important information concerning the ergot alkaloids, but also findings of even greater significance. Ergotoxine was discovered to have the then curious property of reversing the pressor action of adrenaline. it was the first of the adrenoceptor blocking agents and by its use it was shown that sympathetic nerves could produce both vasoconstrictor and vasodilator responses. The βeta blockers, such as propranolol, so brilliantly conceived by Dr. J. W. Black FRS, can be traced back directly to this observation. Histamine, now known to be an important mediator of tissue response to injury, and more particularly of allergic reactions, that themselves had been subject to pioneering studies by Dale, was isolated from ergot extracts and its pharmacological effects analysed by Dale and Laidlaw. Interest in adrenaline and histamine led to the synthesis and study of other amines and papers by Barger and Dale describing this work were published in 1910 and 1911. It was recognised that certain of these amines had the property of reproducing by peripheral action many of the effects of

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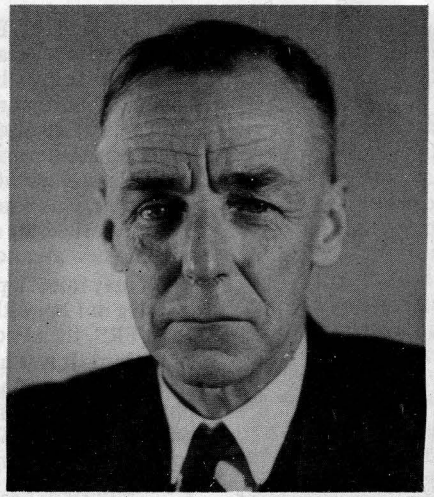

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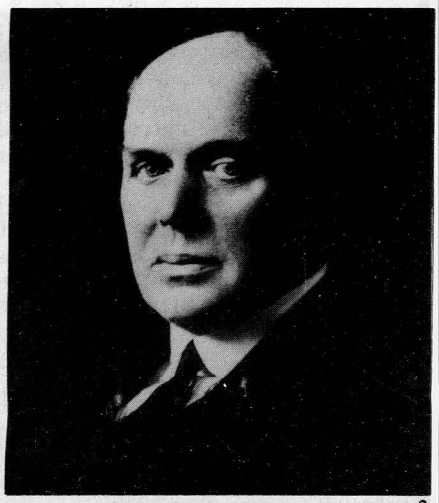

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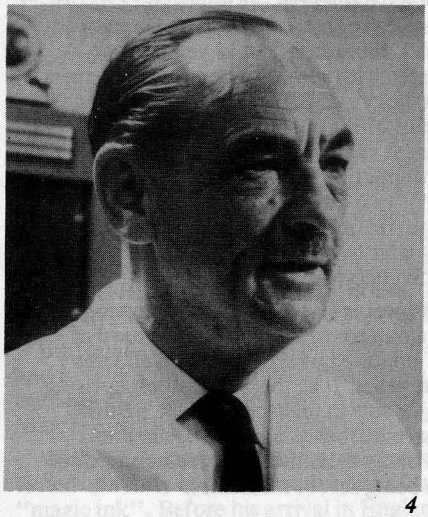

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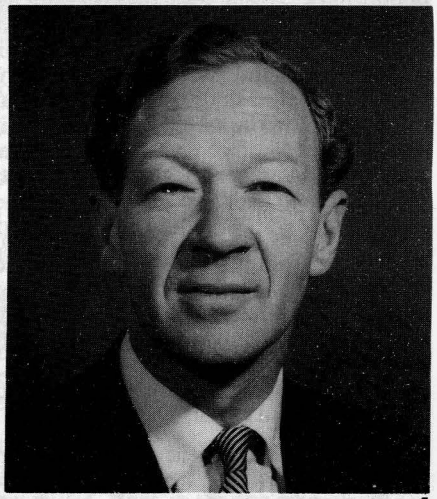
1. *Sir Henry Dale, FRS, Director, Wellcome Physiological Research Laboratories 1906-1914.*
2. *Dr. John Trevan, FRS.*
3. *Dr. Andrew Balfour (later Sir Andrew), Director of Wellcome Bureau of Scientific Research 1913-1923.*
4. *Dr. George Hitchings, Foreign Member, Royal Society, Vice-President of Research, Burroughs Wellcome Co. USA, for many years.*
5. *Dr. D. W. Adamson.*
6. *Scientific staff at the Wellcome Physiological Research Laboratories, Brockwell Hall, in 1914. Five became Fellows of the Royal Society: H. H. Dale—centre, front row; G. S. Barger—on Dale's immediate right; A. T. Glenny—second left, back row; J. H. Burn—centre, back row; A. J. Ewins—extreme right, back row.*



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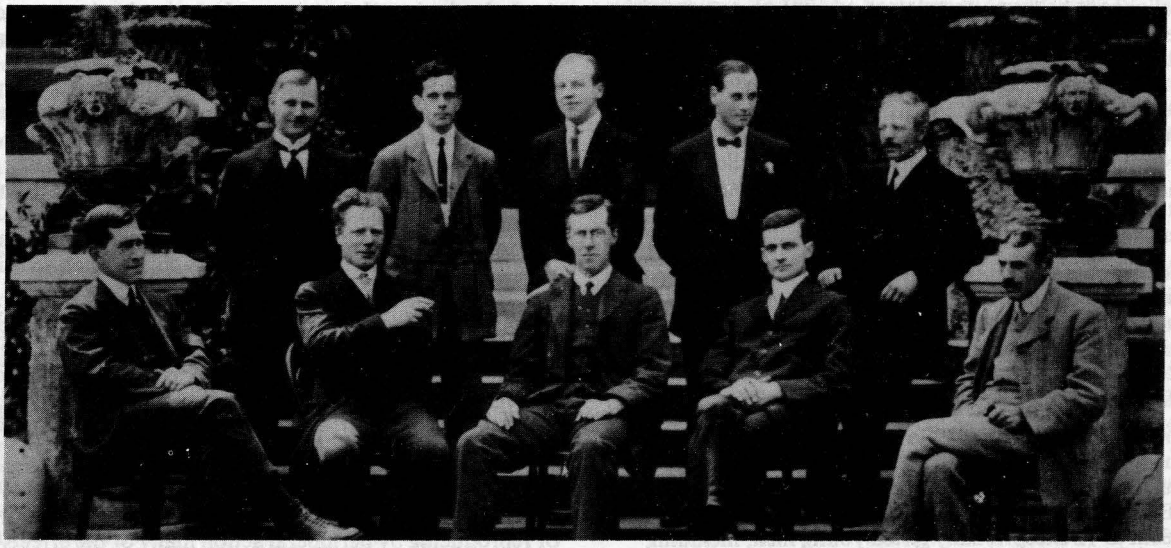

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stimulating sympathetic nerves. Dale coined the word "sympathomimetic" to define this action and a number of the compounds described, notably tyramine, have become valued and much used tools that have contributed substantially to the understanding of the physiology of the adrenergic nerve mechanism and to the finding of new medicinal substances that interfere with this mechanism.

This did not exhaust the excitements that stemmed from the study of ergot. In 1914 Ewins described his identification of acetylcholine in a particular ergot extract. In the same year, Dale discovered that this substance had both muscarinic and nicotinic properties, by which it stimulated the effects of different groups of efferent nerves. This was the first step towards the building over the next two decades of the modern concept of the chemical transmission of nervous stimuli and the special role of acetylcholine in this regard, a work which led to the award of the Nobel Prize to Sir Henry Dale and Professor Loewi in 1936.

Dr. J. W. Trevan joined the Wellcome Physiological Research Laboratories in 1920 and was its Director from 1941 to 1953. He is, of course, mostly remembered for his major contribution to biometrics, but his inventiveness extended in many directions. To increase the accuracy of experimentation he invented the micrometer syringe and a simple but highly accurate deflection balance, again incorporating the micrometer principle. He was first to demonstrate the fundamental concept that the penetration and hence the action of a drug depends largely on its state of ionisation; this was shown in studies of the relation of hydrogen ion concentration to the action of local anaesthetics.

Perhaps the outstanding single piece of research work from the company in the 1920s and 1930s was the isolation in 1929 by Dr. Sydney Smith, working in the Development Laboratories, of one of the glycosides of *Digitalis lanata,* a variety of foxglove. The properties of this leaf in the treatment of congestive heart failure usually as a crude preparation, had been known for some time. It is a classic example of Wellcome's philosophy in pursuit of excellence—purification, formulation, analytical control and precision of standardisation. Fifty years later 'Lanoxin' brand digoxin is still the chosen digitalis therapy in a large part of the world. This followed the appreciation that the bioavailability of digoxin and hence reproducibility of its therapeutic action and safety was highly dependent upon the particle size of the formulation. Wellcome's present product set a new high standard of bioavailability.

The biological story

Another outstanding example of the initiative of the company was shown by its ability to manufacture insulin on a large scale at Dartford in 1923, within a year after its discovery by Banting and Best, in Canada. This was the first insulin to be produced in Britain.

Indeed, Wellcome had always had a strong interest in biologicals and it was the demand for diphtheria antiserum (first made in a stable of eight horses) that caused Wellcome to transfer his Physiological Research laboratories out of Central London in 1898 to the ten acre site at Brockwell Hall. Mr. A. T. Glenny joined the staff there as a young man and controlled the production of antisera for 40 years. In 1904, at the age of 20, he became the first to use formalinised toxin to immunise horses for antitoxin production. During the First World War, greatly increased production demands were met; large quantities of tetanus and diphtheria antitoxins, anti-gas gangrene sera and typhoid vaccines were made available for the Forces.

The opportunities for new ventures developed from 1921, when the Physiological Research Laboratories had been transferred from Brockwell Hall to a 108 acre site at Langley Court, Beckenham, Kent. Mr. Glenny and his staff contributed substantial advances in vaccine and antisera production and standardisation and in immunisation procedures, both for medical and veterinary purposes. They were the first (in 1921) to enunciate the principles of primary and secondary stimulus in immunisation, to suggest (in 1923) that diphtheria toxoid be used for the active immunisation of healthy children, as a preferable alternative to the use of heterologous antiserum for the treatment of children after they had developed diphtheria. They discovered the adjuvant effect of alum on diphtheria toxoid in 1926, advocated the human use of toxoid antitoxin floccules (TAF) in 1927 and developed the highly antigenic alum precipitated toxoid (APT) which became the standard preparation for diphtheria immunisation both in this country, and abroad. There is little doubt that contributions made by Wellcome research staff to knowledge of the development of safe and effective diphtheria vaccines, how they should be used for the protection of children, and the control of disease in the country made it possible for health authorities to undertake mass vaccination campaigns with success, at a time when morbidity and mortality from diphtheria were of general concern.

Quality

Henry Wellcome loved catch-phrases such as 'Products of Quality', 'Weapons of Precision', 'B.P. (British Pharmacopoeia) or Better', 'Beware of *Pirates* and Copyists' (he was using in 1900 a word that has become widely used in the pharmaceutical industry only in recent years). Yet few would dispute their aptness or accuracy in the context in which he used them. He aspired to quality in everything he did and expected it from everyone else in the company. The craftsman working on his medicine chests, the printer and binder of diaries and publications, the stableman in charge of the serum-producing horses, the laboratory technician mounting specimens in his museums—all were expected to achieve the highest standards—none more so than the producers of his medicines, the pharmacists involved in formulation and presentation and, above all, the analysts engaged in assessing purity and potency. Wellcome's pursuit of excellence never faltered and it became an integral and enduring part of the company's philosophy. Today, in most countries of the world, standards of quality and methods of testing for potency and freedom from toxicity have been fixed by regulatory authorities such as the Food and Drugs Administration in the U.S.A. and the committees set up by the Medicines Commission in the United Kingdom. Wellcome was in many respects ahead of his time.

Another development of far-reaching importance initiated by Henry Wellcome was to place the analytical control throughout the process of manufacture (from new material to finished product) outside the responsibility of the head of production, which meant that only the Chief Analyst could release a batch of any product for sale. Dr. Graham Foster occupied that position with distinction for many years at Dartford and served on various Pharmacopeia and Pharmaceutical Codex committees. When the first British Veterinary Codex was issued by the Pharmaceutical Society of Great Britain in 1953 (the first of its kind in the world) Dr. Foster and several other Wellcome and Cooper scientists played a prominent part in its compilation.

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It was the tragedy of thalidomide outside the company which ultimately led to government control of all aspects of the manufacture, testing and even marketing of medicinal substances, for human or veterinary use, and of the claims made for their efficacy and safety.

The scrupulous care and high standards which attended the manufacture and testing of Wellcome products stood the company in good stead. As far back as 1954, even before thalidomide was launched by a German company, Wellcome introduced a system for recording adverse reactions, no matter how minor, to any Wellcome product. This pioneering work led to the setting up of an adverse reactions registration centre within the Wellcome clinical research division. This type of reporting is now mandatory under the Committee on Safety of Medicines in Britain and similar bodies in other countries.

Extension of research overseas

Apart from his laboratories in this country, Wellcome was also instrumental in setting up laboratories abroad. Specialised laboratories for the study of tropical medicine took shape from a characteristically generous and practical gesture by Wellcome in 1901. One of the first civilians to enter Egypt in that year, after Kitchener's victorious reconquest of the Sudan, he observed for himself the condition of the disease-ridden native population. His immediate response was to offer to the Gordon Memorial College, Khartoum, equipment for chemical and bacteriological laboratories for the study of the prevalent local diseases, an offer which led to the establishment of The Wellcome Tropical Research Laboratories, Khartoum. Under the first director, Dr. Andrew Balfour, a vigorous campaign against tropical disease was begun, which among other things soon brought about a striking reduction in the annual death rate from malaria.

To provide opportunities for more extensive research, Wellcome in 1907 equipped a floating laboratory in a barge which could be towed behind a tug to otherwise inaccessible regions in the upper reaches of the Nile. This new laboratory was placed under the charge of Dr. Wenyon, attached to Khartoum as travelling pathologist and protozoologist from the London School of Tropical Medicine; investigations carried out on the Culex, as this laboratory was appropriately named, provided invaluable material for his classical work in later years. In 1912 Wellcome handed over the whole undertaking to the Sudanese Government, including a museum collection.

In the Burroughs Wellcome Co. U.S.A., research activity, largely in chemistry, was being introduced by 1928 and by 1944 a small but highly significant team had developed and had published 148 scientific papers. The earliest leaders were Dr. J. S. Buck, whose synthetic chemistry ranged widely over many important medicinal fields—papaverine, sympathomimetics and novel anaesthetics, and Dr. L. Reiner, who was then concerned mainly with the chemotherapeutic action of arsenicals. The high pharmacological reputation of the research group was built up by Dr. E. J. de Beer who joined the company in 1934. His earlier contributions included studies of anaesthetics, analeptics and sympathomimetic amines and their antagonists, in association with the chemical group by then led by Dr. R. Baltzly, but his team was to become responsible in the late forties for important new pharmacological agents.

The appointment of Dr. George Hitchings in 1942 was to have yet more dramatic consequences. He instituted with his colleagues a programme of planned research aimed at blocking a key stage in the metabolic pathways of cancer cells and infective agents by presenting them with chemicals which are very similar to those they use naturally in the course of their development, thus inhibiting their growth, the so-called "rational" or antimetabolite approach. In this respect, he was a pioneer. Some years ago, on receipt of his Passano Award, he gave an outline of his method of research.

"As we came on to the scene in the early 1940s, the world of chemotherapy was sharply divided between the screeners and the fundamentalists. The screeners were dutifully poisoning infected mice with whatever came to hand off the shelf. They reckoned that if they tested enough compounds, sooner or later they would run across one that did more damage to the infecting organism than it did to the host.

The fundamentalists disdained all that as being devoid of intellectual interest. They proposed instead that it would be more profitable in the long run to concentrate on the fundamental physiology and biochemistry of hosts and parasites. Some time in the distant future, they thought, we might have enough information to design drugs on a rational basis.

On the other hand, it seemed to our group that some kind of middle course might be possible—a course that would generate basic information which chemotherapy could then exploit—a course that could be both intellectually stimulating and productive. The way to this new approach had been opened by the anti-metabolite theory.

One of the consequences was that we were uncommitted as to targets. We could follow our thoughts and our anti-metabolites wherever they led us. It committed us simultaneously to a consistent programme of study and an opportunist's awareness of possible applications.

The results are cumulative; the solution of one problem creates the tools and understanding that facilitate the solution of the next problem."

There needs to be a balance between the pragmatic opportunist approach and the basic scientific work. "Synthesize and screen" will be with us for many years, until we have more sophisticated methods of designing drugs'. But we need to invest in those methods now, for the long-term future.

The success of George Hitchings' approach has been outstanding. He and his team discovered many drugs, the first of which was the antimalarial pyrimethamine (Daraprim), a success to which Dr. L. G. Goodwin, working in the Wellcome Laboratory of Tropical Medicine, contributed a major role. Another example of the pioneering work of the team was the synthesis of 6-mercaptopurine, one of the first effective drugs with tolerable side effects for the treatment of malignancy. After investigation at Tuckahoe and the Sloan-Kettering Institute, it was marketed as Purinethol in the United States (Puri-nethol in most other countries) to offer the physician a weapon most useful for the treatment of acute leukaemia in children. Another purine, thioguanine, from the same stable, is currently used in the treatment of various types of leukaemia.

One of the most exciting research developments—scientifically, medically and commercially—in the whole history of the company is the allopurinol story. This resulted from the team's search for inhibitors of xanthine oxidase that might thereby enhance the therapeutic action of

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6-mercaptopurine. The inhibitor proved also (as forecast) to have the more important effect of preventing the formation of uric acid. Allopurinol (Zyloric or Zyloprim) was the first compound found to have this property and is the drug of choice for the treatment of gout and other conditions associated with urate disorder.

Azathioprine (Imuran) was synthesised by the team in a search for a drug that released 6-mercaptopurine slowly after administration. The latter had been found to depress antibody production and to prolong the survival of kidney grafts in animals, but azathioprine was found to be superior to 6-mercaptopurine in this respect and to be less toxic. A report on this finding led rapidly to its first successful use in allowing the survival of human renal transplantations in Boston, Edinburgh and Paris. It became the first compound to be accepted as effective in preventing graft rejection in humans and in the 15 years that have elapsed, few kidney transplants have ben undertaken without azathioprine cover to prevent rejection. The use of the drug has been extended to patients suffering from severe forms of various autoimmune diseases. Interestingly, over the six years during which the F.D.A. in the U.S.A. were satisfying themselves on its safety, Imuran was provided free by Burroughs Wellcome Co. to virtually all the recipients of kidney transplant in the States.

Perhaps the peak in U.K.-U.S.A. research collaboration during the 1950s came with the development of cotrimoxazole (Septrin or Septra). Research by Dr. Bushby and his colleagues at Beckenham on the pyrimidines identified the antibacterial potential of trimethoprim. Hitchings and his colleagues showed that this was due to its antimetabolite properties at one stage of metabolism within the bacteria, confirmed that sulphonamides attacked bacteria at another stage and postulated that a combination of trimethoprim and sulphonamide would have a powerful synergistic action. This was confirmed in laboratory studies and subsequently in clinical trials. It has found a world-wide market for the treatment of urinary tract and respiratory infections of gonococcal urethritis and of typhoid and paratyphoid fevers and certain skin infections. With allopurinol, it has played a major role in transforming the Wellcome Group into one of the largest British pharmaceutical companies.

Meanwhile, at the Wellcome Research Laboratories in Beckenham, the chemists were also successful. A team, led by Dr. D. W. Adamson (later to become research director for twenty years) was working in close association with a pharmacological group under Dr. A. F. Green. Within the period 1946 to 1951 they discovered no fewer than five novel compounds that became marketed products. The first of these discoveries was procyclidine (Kemadrin) which for many years has been used in the management of Parkinsonism and to control drug-induced extrapyramidal syndromes. Another was diethylthiambutene (Themalon) which, because of its powerful analgesic/hypnotic properties, made it particularly suitable for canine surgery, especially as its actions could be readily terminated by nalorphine, that as Lethidrone, had recently been made available by the company. The most important of the compounds discovered was triprolidine which, under the name of Actidil, or with L(+)pseudoephedrine as Actifed, has given Wellcome an outstanding powerful and specific antihistamine and a nasal decongestant preparation used extensively for the past 25 years in most countries of the world.

From Beckenham also came the notable chemotherapeutic contribution of the synthesis of bephenium by Dr. F. C. Copp in 1955.

The present and the future

I was invited to join Wellcome as Group Research and Development Director in 1973, having spent some 18 years in the Department of Pharmacology at The Royal College of Surgeons of England. There, we had been fortunate to carry out some fundamental work notably in the field of prostaglandins. It was in 1971 that we discovered that aspirin-like drugs inhibited the biosynthesis of prostaglandins and I proposed this as the mechanism of their therapeutic activity. I would not have joined Wellcome had I not been keenly aware of Henry Wellcome's research heritage, kept alive by successive research directors through the years. This derived from his permanent interest in research, his ability to fund it and his long-term concept of basic research outside of academia. He had two aims, first to add to the sum of scientific knowledge ("Science and Industry" was his catchphrase) and secondly to invent and discover new products where there is a health or market need. There was also his foresight in establishing scientific laboratories, his determination to attract the very best researchers and the unique structure which he set up in his will for the Wellcome organisation in which all of the distributed profits are used by The Wellcome Trust for the support of medical research. Another important catchphrase of Henry Wellcome's to the scientists who work for The Wellcome Foundation is "Freedom of Research, liberty to publish."

When I joined Wellcome, I was able to bring with me some members of the international research team which I had built up at The Royal of Surgeons and in the last few years this has increased in size and substantially in reputation. It is now a separate department headed by Dr. Salvador Moncada. My objective has been not only to guide the direction of Wellcome research, for which it is necessary to appreciate and give priorities to all of the research programmes but also to remain a working scientist with an in-depth knowledge and input into the field of prostaglandins.

We are working on many aspects of prostaglandin research and the work is unstructured enough to take out interests over topics ranging from anti-inflammatory agents to substances to prevent heart attack and stroke. We discovered prostacyclin in 1976 and found that it is the most potent substance known in preventing platelet aggregation. Its generation by the vessel wall is surely the mechanism by which healthy blood vessels prevent the deposition of platelets on their inner surfaces. In fact, our discovery of prostacyclin arose out of our interest in thromboxane A_2, a substance with directly opposing activities. Since then, we have built up substantial evidence to show that the balance between thromboxane A_2 formation in platelets and prostacyclin formation in the vessel wall can be a control mechanism for intravascular thrombosis. As an outcome of our discovery of prostacyclin, there is now good hope that several types of cardiovascular disease will be conquered in the 1980s.

Another aspect of our research into the prostaglandins has led to new ideas on the mode of action of anti-inflammatory substances. As mentioned before, we discovered in 1971 that aspirin and similar substances inhibited the cyclo-oxygenase pathway of arachidonic acid metabolism and proposed that this was the biochemical basis for the activity of aspirin-like drugs. In 1975, Samuelsson and his colleagues discovered a second enzymic pathway of arachidonic acid metabolism—the lipoxygenase pathway—and it is becoming increasingly evident that this has an important role in the generation of active substances. Some of the lipoxygenase

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products may well act as chemotactants in the inflammatory process, thereby bringing about the invasion of the damaged site by phagocytic cells. Very recently Samuelsson has shown that the long-known "slow reacting substance of anaphylaxis", or SRS-A, is also a derivative of this pathway. Thus, substances which inhibit both the lipoxygenase pathway and the cyclo-oxygenase pathway could well have a more potent effect than aspirin in inflammation. They could also have an effect in asthma. Such substances already exist at the research level.

It has also become evident in recent years that anti-inflammatory steroids inhibit the release of arachidonic acid by phospholipase from phospholipids in the cell membrane. Thus, a substance which inhibits both pathways or arachidonic acid metabolism may well be as powerful as a steroid as an anti-inflammatory agent. Interestingly, Dr. Rod Flower, in our department of prostaglandin research, has shown recently that the anti-inflammatory steroids release a peptide from macrophages. This peptide seems to be a "second messenger" which brings about the inhibition of phospholipase.

There are two other subjects of immediate excitement within Wellcome which I would like to mention. The first is Acyclovir and the second is Interferon. Both illustrate the fruitfulness of Wellcome's policy of encouraging fundamental research in the drug industry.

Acyclovir is a substance which was synthesized by Dr. Howard Schaeffer in the splendid new laboratories in North Carolina and sent for screening to Beckenham. Dr. John Bauer discovered that it was a potent inhibitor of the replication of the herpes simplex virus. Back on the other side of the Atlantic, Dr. Trudy Elion began working on its mode of action and showed very elegantly that Acyclovir was a sort of time bomb that only exploded in herpes infected cells. The invasion of the cell by the herpes virus induces an enzyme which phosphorylates acyclovir and turns it into a toxic substance. Thus, this drug is only toxic to those cells invaded by the herpes virus. In the clinic, acyclovir is potent against herpes simplex infections of the eye and is now being tested against other types of herpes infection.

For many years now, we have had at Beckenham a centre of excellence in Interferon research headed by Dr. Norman Finter and Dr. Karl Fantes. Interferon was first discovered some 18 years ago by Dr. Isaacs at Mill Hill who showed that this protein had potent anti-viral activity and was liberated by cells infected by viruses. It is the cells natural defences against viral infection. The difficulties of manufacture and delivery of a protein discouraged industrial development of this substance as an anti-viral agent. However, in the last few years there has been increasing evidence that it also possesses anti-cancer properties and there is now a high level of excitement in the scientific world as to the potential of this substance. During 1980, we shall be starting clinical trials in several different forms of cancer. However, the substance is still an experimental agent which can at present only be manufactured at alarmingly high costs.

During this lecture I have tried to illustrate the research heritage of which The Wellcome Foundation is justly proud. Ever since Dale, research directors have tried to attract the very best researchers and I, in turn, am proud that we now have on our staff not only the scientists I have already mentioned throughout this talk but also other brilliant scientists such as Dr. Jim Black FRS, Head of Therapeutic Research, Dr. Pedro Cuatrecasas, Head of our Research Labs in RTP, Dr. Trevor Jones, Head of our Pharmaceutical and Chemical Development Laboratories and many others who have attained international recognition.

There has been a fashion in recent years to claim that the major discoveries of medicine have already been made and that further advances, progressively more difficult to accomplish, will be mainly refinements of existing treatments. I dispute this view as being altogether too pessimistic.

I think we know only about a tenth as much about how the body works as we shall know in a hundred years' time, There are a lot of exciting discoveries yet to be made and, given the continuance of Wellcome's research heritage, several of those will be made in our research labs. There are major diseases yet to be conquered and methods of prevention and treatment still to be improved. Yet only one compound in several thousands synthesized is expected to be marketed. It now costs around £10 million and takes up to ten years to develop a compound before its issue as a product. As Sir Henry Dale once wrote, "The research function must never evade the challenge of investigating difficult areas. Fundamental research having no foreseeable immediate effect must not be allowed to fall into arrears through neglect. We must not allow short-cuts, shelving exceptions, discounting difficulties, making premature claims in the hope that we may be able to reach some dramatically practical result without submitting to the full exacting discipline of science."

Acknowledgements

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Nicholas Culpeper and his Pharmacopoeia*

by D. A. JONES

The name of Nicholas Culpeper has been perpetuated by his Herbal and by the herbalists shops which bear his name in London and in the Provinces. He was a contemporary of several famous physicians, including William Harvey, Thomas Sydenham, Thomas Willis and Robert Boyle.

When Nicholas was born in London on October 18, 1616, his mother was already a widow, her husband, the Rev. Nicholas Culpeper, Rector of Ockley, Surrey, having died some two or three weeks before the birth of their son. Although one writer says that there is no record of Culpeper having attended Cambridge University, most historians agree that he studied there for a time; certainly his knowledge of Latin is not disputed.

In 1634 his grandfather, The Rev. William Attersol, placed him as an apprentice, with a fee of £50, to Daniel White, a London apothecary near Temple Bar. A year and half later Daniel White ran into financial difficulties and fled to Ireland. A new master was found—Francis Drake of Threadneedle Street. Drake had been made free of the Society of Apothecaries in 1628, so it seems likely that he was not much older than Culpeper. Here the roles of pupil and teacher became, as it were, reciprocal for Culpeper taught Drake Latin in less than a year and half, according to the records. We can only guess whether the success of this short course can be attributed to teacher or taught. Culpeper and a fellow apprentice named Samuel Leadbeater remained with Drake until Drake died in 1639. Culpeper and Leadbeater then became bound to Stephen Higgins, who at that time was Master of the Society of Apothecaries.

In 1639, his mother died and "left him well", which may account for the fact that he broke his indentures shortly after and later he married Alice, the 15 year old daughter of John and Alice Field. Alice is described as being "of good extraction and excellent breeding", moreover, she brought him a considerable fortune. There were seven children of the marriage of whom only the fourth survived: a daughter named Mary. After his marriage Culpeper set up in practice as astrologer and herbalist in Red Lion Street, Spitalfields, next to the Red Lion Tavern. It seems that quite soon he became very popular in the district. He was widely known to have special consideration for the poor and he made a habit of treating such patients with simple medicines, often without charge.

Although some labelled Culpeper as an atheist, his interest in religion is evident throughout his writings, especially in his prefaces. His political sympathies were with the Parliamentarians, whose forces he joined during the Civil War. In one of the battles he was wounded in the chest by a musket shot and he never completely recovered from this wound. After the war he was in poor health and was by then suffering from tuberculosis. He devoted his time and energy to his practice and it was at this time he made his first ventures into writing.

Culpeper's place in history depends entirely upon his writings. The first and most important of his numerous works was his translation from Latin into English of the London Pharmacopoeia. It was published by Peter Cole in 1649 with

the title: *A Physicall Directory, or, A Translation of the London Dispensatory made by the Colledge of Physicians in London.* Poynter writing in 1956 makes it clear that the translation was not a project undertaken by Culpeper on his own account, but that he was "put upon it", although we are not told who commissioned it. No doubt, Culpeper was doing a service to his fellow apothecaries in publishing the translation; nevertheless, a virulent attack was made on him by one Marchamont Needham in the royalist periodical *Mercurius Pragmaticus.* Needham has been described as a "freelance journalist without scruples who changed sides as occasion seemed to demand". What he had to say about the Dispensatory was that it was "done (very filthily) into English by one Nicholas Culpeper, no gentleman or scholar". In spite of this criticism, the Directory was so successful that the first edition in quarto was followed the next year by a folio edition, and a 3rd and 4th edition, both in folio, appeared in 1651 and 1653. To the fourth edition was added "Key to Galens Method of Physick". On the title-page of the 1649

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edition the author was styled as Nich. Culpeper, Gent., in 1650 as Gent. Student in Physick and in 1651 as Gent. Student in Physick and Astrologie. At no time did he style himself doctor, but on one occasion Culpeper protested to his publisher Peter Cole for dubbing him Gent. "for", said he, "all the world must know themselves that Doctor of Physick is a gentleman in the superlative degree".

The College of Physicians did not welcome the translation of their pharmacopoeia; in fact, it was resented as an impertinence and a disclosure of technical knowledge up to then available only to those who understood Latin. So by the time the 1653 edition came out, Culpeper had so enraged the College that they refused to give him a licence to practise, thus making him a bitter enemy.

There is no doubt that Culpeper was well acquainted with the medicinal herbs and drugs of the time, as well as with the methods of their preparation and administration. He was familiar too, with the herbals, of which he specially mentions Gerard's and Parkinson's. He deplored the fact that these and other herbals were too costly for the poor man and for this reason his own books were offered to the general puiblic at what were then considered to be reasonable prices.

His most popular work was his herbal or to give it part of its full title: *The English Physician Enlarged, with 396 medicines made of English Herbs* . . . In it, he lists various herbs together with the planet governing each. Culpeper saw the need for cheap physic and the book has had a continuous sale.

Culpeper died in January 1654,. Although he had suffered from tuberculosis, it seems likely that his death was hastened by the excessive use of tobacco and alcohol. He was often heard to say that tobacco was the greatest enemy to his health, but that he was too accustomed to it to give it up.. Moreover, Thomas Mayerne attributed his death to "the bad French wine which Culpeper drank at the Guilded-Lyon in the Strand".

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Some drugs of the 17th Century*

by R. G. TODD

The Civil War of the mid-century and the Revolution of 1688 laid the foundations of parliamentary government as we now know it and the foundations of modern science and technology were firmly laid with the establishment of the Royal Society in 1662. The work of some of its distinguished early members such as the Honourable Robert Boyle and Isaac Newton heralded the rapid spread of experimental science and contemplation of the uses to which it might be directed in agriculture, industry, navigation, engineering, and medicine. Fundamentally, however, medicine as practised was slow to change. Seventeenth-century medicine was still rooted in the past, based on the superstitions and beliefs of the Middle Ages and the doctrines and dogmas of the ancient world. A physician of the early 17th century must have differed little in his beliefs and practices from Chaucer's *Doctour of Phisyk* of three centuries earlier. Many drugs owed their reputation to the ancient and widely held doctrine of similitudes or signatures, according to which the Creator, in providing natural remedies for the relief of disease, had stamped on them indications of their particular remedial property. Their usefulness was shown by their shape, form, or colour, or by a particular quality. If 17th century medicine was loath to divest itself of the influence of these ancient beliefs, it did make a significant pharmaceutical advance early in the century with the publication of our first pharmacopoeia, the *Pharmacopoeia Londinensis,* which became the official pharmacopoeia for England and Wales. It was compiled by the London College of Physicians and issued in 1618. It was, commendably, the first official publication describing and classifying the drugs and medicines currently used and approved by the College of Physicians and, as a published document, opened its pages to criticism, the most informed of which could only lead to improvement. It was shielded from the curiosity of the vulgar by being written in Latin but this was only a temporary protection, penetrated by an English translation from the gladiatorial pen of the College's severest, if by no means most objective, critic who subscribed himself "Nich. Culpeper Gent. Student of Physick and Astrology, living in Spittle-fields neer London".

The pharmacopoeia and its two 17th-century successors, the second and third editions of 1650 and 1677, differed little in form and content.

The *London Pharmacopoeia,* as represented by its three 17th-century editions, gave an extensive coverage of the drugs and compounded medicines of the time, classifying over 1100 simples and over 900 formulas for compounded medicines. Of the formulas, more than half are ascribed to ancient authors. In an age of polypharmacy, it is not surprising to find that over 200 of these formulas contain more than ten ingredients, several contain over 50 with the pride of place going to *Antidotus Magna Mathioli,* the great antidote of Matthiolus against poison and plague, which contains 130 ingredients. A pharmacopoeial page lists the *Animalia* and also *Animalium partes, excrementa, et ex iis desumpta,* that is, "Parts of animals, their excrements, and substances taken from them". There are some 35 animalia, from Aselli (Woodlice) to Vulpes (Foxes). They are a curious collection, including frogs, snails, and puppy-dogs, emasculated tom-cats, grasshoppers and ants, larks, swallows, sparrows, and wagtails, whelks and crayfish, hedgehogs, badgers, otters, and moles, lizards, scorpions, and vipers. Most of them are mentioned by Dioscorides but it is doubtful whether more

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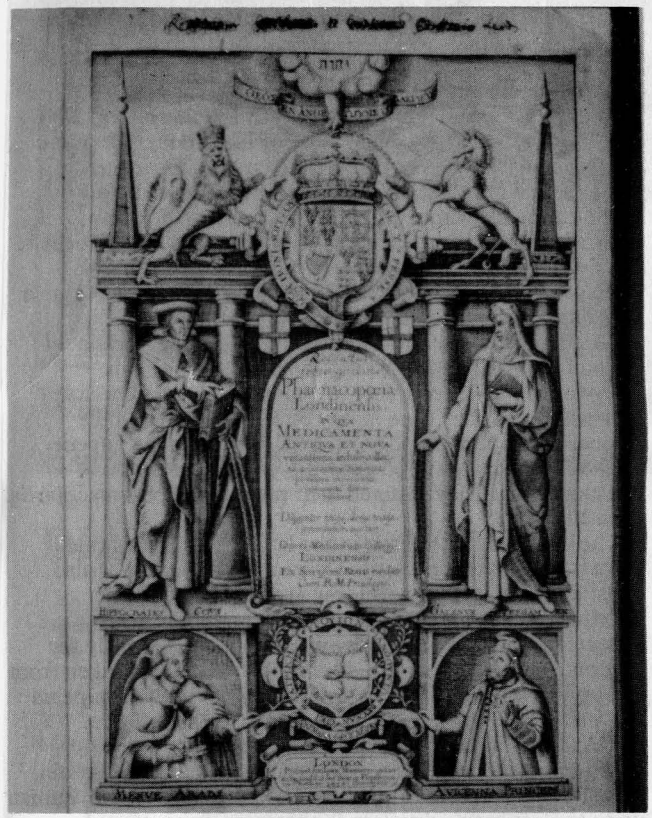
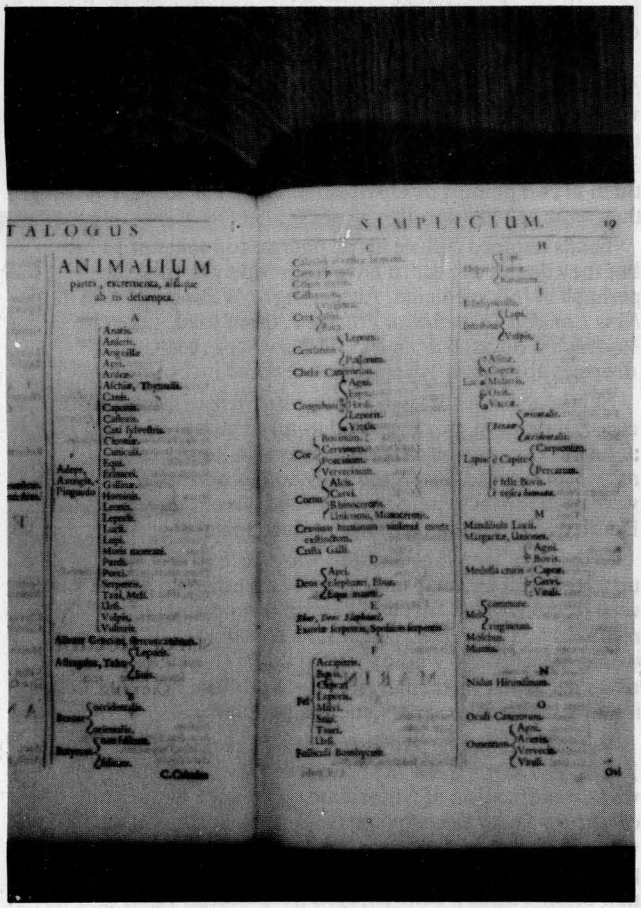


Left: Title page from the 1618 Pharmacopoeia.



Right: List of Animalium taken from The London Pharmacopoeia of 1650.

than a few were extensively employed in orthodox medicine by the 17th century, although still used in folk medicine. The pharmacopoeia included a compound oil prepared from newly-whelped puppy-dogs, *Oleum Catellorum* (Oil of Whelps) which according to Culpeper was excellent good for limbs and muscles weakened by wounds and bruises. There was a compound oil prepared from swallows, *Oleum Hirundinum,* used in the treatment of sprains and bruises. There was a plaster of frogs, *Emplastrum de Ranis,* prepared from frogs, earthworms, litharge, quicksilver, and various herbs and used in the treatment of veneral disease.

An oil much used in the treatment of aches and pains of the joints and back, *Oleum Vulpinum* (Oil of Foxes) had to be prepared, preferably from a fat fox of middle age caught by hunting about the autumn. The beginning of the formula for this oil in the pharmacopoeia reads: *Recipe vulpem pinguem aetatis mediae"* and then, in brackets, *"quam fieri protest",* that is "Take a fat fox of middle age" and then, in brackets, "if you can get one". Culpeper, in his translation, has an amusing marginal note on this parenthetic "if you can get one". "That", he comments, "was well put in, therefore when you have caught a Fox, bring him alive to the Colledg, and let them look in his mouth first and tell you how old he is, so shall your Oyl be *cum privilegio*". Clearly, Culpeper was one of our earliest advocates of the need for quality control in the preparation of pharmaceuticals.

Only three of the 35 animalia included in the 17th-century editions of the *London Pharmacopoeia* continued to be used medicinally into the 20th century, namely, Cantharides, Leeches, and Cochineal, and only the last, Cochineal, is retained in the current *British Pharmacopoeia.* Most had been deleted from the *London Pharmaocopoeia* by 1721 but

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several retained their place well into the 18th century. These were snails and earthworms, scorpions, toads, skinks and vipers, and woodlice.

Snails and earthworms were esteemed in the 17th century as valuable aids in the treatment of consumptions and also in affections of the kidneys and bladder. They were not deleted from the pharmacopoeia until 1746. The 17th-century pharmacopoeia included a compound water and a compound spirit of both snails and earthworms, and earthworms were ingredients of several other official preparations including Oil of Whelps and Plaster of Frogs.

Scorpions were used in the form of an oil, *Oleum Scorpionum,* which was used against scorpion and other venomous stings. Rubbed into the skin, it was also believed to be a prophylactic against Plague. It was prepared by taking 30 live scorpions, caught when the sun was in Leo, macerating them in two pounds of Oil of Bitter Almonds for 40 days and then straining off the oil.

Toads retained a place in the pharmacopoeia until 1746 but they do not appear to have been widely used except perhaps in folk medicine. According to William Salmon in his *New London Dispensatory* of 1691, dried toad, taken in ½-drachm doses, was an excellent cure for recalcitrant dropsies and, worn as an amulet, it cured incontinence.

Skink, a species of lizard, *Scincus officinalis*, was, from classical times, highly esteemed as an alexipharmic, that is, as an antidote to poisons, and it was also highly regarded as an aphrodisiac. It was the belly and loins of the skink that were used for these purposes, and they were ingredients of Diasatyrion, a 17th-century pharmacopoeial electuary.

Mithridate, or Mithridatium, was, from Roman times right up to the 18th century, one of the best known and most widely used of electuaries, first as an alexipharmic and later being regarded as a universal panacea. According to Culpeper, it would have taken a whole sheaf of paper to have reckoned up all its particular medicinal virtues. In addition to skink bellies, it had 49 other ingredients, including opium.

Venice Treacle, or to give it its pharmacopoeial name, *Theriaca Andromachi,* the theriac or treacle of Andromachus, was a modification of Mithridate introduced in the first century A.D. by the emperor Nero's physician, Andromachus, who replaced skink bellies with the flesh of vipers, increased the proportion of opium, deleted six ingredients, and added 28 new ones. Venice treacle enjoyed a reputation equal to if not greater than that of Mithridate, and European medicine and pharmacy, from Roman times to the 18th century, must have seemed inconceivable without these two panaceas. Their absurdity as effective medicines was fully and finally exposed by William Heberden in 1745, just too late for their deletion from a new edition of the pharmacopoeia, but they were deleted from the succeeding edition in 1788, together with skinks and vipers.

orthodox and in folk medicine. They long enjoyed a reputation for the alleviation and cure of many human ailments. Most 17th and 18th century books on materia medica are high in their praise. They were official in most of the pharmacopoeias of Europe and they retained a place in the *London Pharmacopoeia* until 1809. The woodlice were usually taken whole, 3 to 12 at a time, or in the form of a powder or bruised and digested in Rhenish wine.

And now, turning to the second group which I mentioned earlier—parts of animalia, their excrements, and substances taken from them.

The pharmacopoeia of 1650 includes, the lard, fat, or grease, of some 34 different species, ranging from *Anates* (Ducks) and *Anseres* (Geese) to *Vulpes* (Foxes) and *Vultures* (Vultures) and including human fat. The more common of these fats were used as bases for ointments, plasters, and other fatty-based galenicals, but many were there for the medicinal properties ascribed to them in accordance with the doctrine of signatures and related beliefs. An example is *Pinguedo Ursi,* Bear's Grease, which was esteemed as a hair dressing in the belief that the grease from a very hairy animal would stimulate hair growth.

Oriental Bezoar Stones, were calculi from the intestines of Persian wild goats and possibly other eastern animals. They varied in size from that of a marble to about the size of a hen's egg. They were highly esteemed in the Middle Ages as an antidote to poisons, and, according to Culpeper, they were admirable good in fevers, pestilences, and consumptions. They retained their place in the pharmacopoeia until 1788.

The human skull, usually in the form of a spirit distilled from it, was used in epilepsy. Dried human blood was also considered good against epilepsy and as a haemostatic. Calcined human bones were used in the treatment of dysentery. Human fat was highly esteemed as a remedy for rheumatism. Fasting spittle, specifically, the spittle taken from a young man fasting, was an antidote to the bites of serpents and mad dogs. Human milk was used to bathe inflamed eyes and was considered beneficial in pulmonary consumption. Powdered human bladder calculi, in 15-grain doses, were reputed to dissolve other calculi. Fresh human urine (a glass or two drunk in the morning on an empty stomach) was good against gout, hysterical vapours obstructions, jaundice, and dropsies, and was applied externally in skin complaints. Various spirits, essences, and salts of urine were in vogue in the 7th century and continued to be used into the 18th century as domestic remedies. Human dung, dried and mixed with honey cured inflamed wounds and quinsies, and dried human dung, in 2-drachm doses, was used in the treatment of agues. Mummified human flesh was advocated in epilepsy, vertigo, and palsy, and was applied externally to wounds to prevent mortification. All these parts and products of the human body were included in the 17th-century editions of the *London Pharmacopoeia* and, indeed, human skull, human calculi, human fat, and mummy, were not deleted from the pharmacopoeia until 1746.

17th-century editions of the *London Pharmacopoeia* included the dung of 13 different species but only five of them retained their place into the 18th century. These were the dungs of dogs and horses, or rather stallions, and of three birds: geese, pigeons, and peacocks.

According to Quincy's *English Dispensatory* of 1724, peacock's dung was reckoned a specific in epilepsy.

Culpeper, curiously enough, despite their wide popularity, especially as household remedies, had no use for excrements. He both castigates the College of Physicians for including them in the pharmacopoeia and dismisses them in a single scatological sentence, which delicacy forbids repetition, but in which he impugns the general cleanliness and personal hygiene of the members of the College, likens them unto Jakes Farmers, and implies that their odour would have been less repellent if they had left excrements alone.

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DIARY DATES 1981

February 26	A joint meeting of BSHP and PSGB at the Pharmaceutical Society, 1 Lambeth High Street London SE1 at 7 pm. "The History of Perfumery" by Mr E.L. Simco. Coffee and biscuits at 6.30 pm
March 27-29	BSHP Spring Conference. King Alfred's College, Winchester. Theme "Public Health Through the Ages — Winchester model". Programme and booking form will be available later. The full weekend cost will be approximately £30.
May 21	At the Pharmaceutical Society, 1 Lambeth High Street London SE1. Fourth Foundation Lecture by Sir William Paton. Topic and time to be announced later.
September 16	History session, British Pharmaceutical Conference Brighton.

SHORT COMMUNICATIONS

The history of pharmacy embraces an extremely wide range of topics. If you have a special interest — or have done a piece of research on theories, themes, people or purchases why not "write it up". The Committee invite members to produce 10-15 minute papers on subjects of their own choosing for presentation during a special session of the Spring Conference, Winchester March 27 1981. Initially please send a brief note to the secretary at York Place, Edinburgh giving probable title.

OFFICERS

Mr A.H. Briggs has accepted the appointment of auditor to the Society consequent upon the death of Mr G.R.A. Short.

Nominations for the annual election of members of the Committee should be submitted in writing on or before February 1 1981. Members of the committee due to retire in 1981 are Dr J. Burnby, Dr W.E. Court, Dr M.P. Earles and Mrs A. Lothian Short.

CONGRATULATIONS

Mr G. Gunthorpe has been designated a Fellow of the Pharmaceutical Society of Great Britain "for distinction in the profession of pharmacy". Mr & Mrs Gunthorpe are regular attenders at meetings and conferences of the Society.

OBITUARY

Members of the Society will regret the death of Mr G.R.A. Short FPS on June 19. Mr Short had a distinguished career in pharmacy and had international recognition for his work on flavouring materials. He was awarded the Pharmaceutical Society's Harrison memorial medal in 1967 when he gave a lecture on "Flavours and colours in food and pharmacy". He was elected a Fellow of the Linnean Society in 1949.

Many members will recall his great interest in philately and remember his fascinating contribution at a joint meeting of BSHP and PSGB when the topic was "Pharmacy and Philately" (Pharmaceutical Historian Vol 4 No. 3). Quiet and unassuming Reg Short will be missed by many for he would go to extraordinary lengths to be helpful. He served the BSHP as an auditor but his support extended over a much wider sphere. Our sympathy is extended to his family and especially his widow Agnes Lothian Short for we realise how great was her loss.

BOOKS

A founder member and a past president of the Society, Mr L.G. Matthews has had two books published since the last "Historian" was issued.

"The Pepperers, Spicers and Apothecaries of London during the Thirteenth and Fourteenth Centuries" was published by the faculty of the History and Philosophy of Medicine and Pharmacy of the Society of Apothecaries of London, Apothecaries Hall, Black Friars Lane London. It gives a general account of the trading and social acitivities of the London Pepperers, Spicers and Apothecaries together with biographical notes of some 260 of them. The second book is "Milestones in Pharmacy" published by Merrell Division, Richardson-Merrell Ltd, Whitehall Lane, Egham, Surrey. In it the author has dealt with a number of topics of importance in the development of pharmacy ranging from formularies, apothecaries, botany, the formation of the Pharmaceutical Society, NHI, antibiotics and clinical pharmacy.

Another member, Dr John Cule has written "A Doctor for the people", Update Books Ltd, 33 Alfred Place, London WC1E 7DP. The illustrated book is described as "a personal interpretation of the development of general practice in Britain over the last two millennia".

1981

The officers and members of the Committee wish all readers a New Year of great happiness and prosperity.

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1848

The Pharmaceutical Society's Collection of Materia Medica and Herbaria

by DR W.E. COURT

This collection is a museum collection of plants and plant materials used in medicine since 1852 and reflects a period when plant medicines were predominant and the standardisation of medicines was in its infancy.

The museum of the P.S.G.B. is a specialist collection which for more than a century has provided a focal point for the study of contemporary vegetable and animal materia medica and of medicinal poisonous plants. Its history is as old as the Pharmaceutical Society for within a year of the founding of the Society in 1841, the Museum and Herbaria collections, the Library and the School of Pharmacy were all initiated. The collections fall into three unequal groups:—

a) Materia Medica specimens derived from plants and animals.

b) Herbarium sheets of a wide range of pressed plants both British and foreign.

c) Materials of historical pharmaceutical interest.

The Materia Medica collection comprises about 10,250 specimens crude drugs of good quality, commercial material, adulterants and substitutes which have been encountered in commerce.

Included with these specimens are drugs of a by-gone Materia Medica and drugs which have been recently investigated as potential drug sources.

The Herbarium collection of pressed plants comprises some 9,290 herbarium sheets of medicinal and poisonous and British plants including 610 sheets from the Hanbury collection.

Amongst the materials of historic interest are a small Thames sturgeon (believed to be the last sturgeon in that river), students' materia medica sets and curare arrows and blowpipe.

In May 1842 at the first annual meeting of the Society it was reported that two cases for the Museum were being made and a pious hope was expressed:—

"The Council earnestly hope that in due time, by the zeal and liberality of friends, the Society will possess a Museum of Materia Medica which shall do credit to the Society and honour to the nation."

About that time the Society engaged the 36 year-old Theophilus Redwood in the High Panjandrum role of Curator of the Museum, librarian and lecturer in the School. Redwood had been apprenticed in Cardiff, later worked as an assistant to John Bell and conducted his own business from 1830 until joining Jacob Bell on the Journal in 1841. His appointment in 1842 linked the museum to scientific education from the outset.

By May 1843 some 850 Materia Medica specimens had been donated and the Herbarium had been founded by John Charles Payne who had donated a collection comprising 213 specimens of British plants and of all the indigenous official plants of the Pharmacopoeia Londonensis.

Throughout Redwood's curatorship members donated Materia Medica specimens. Three important large additions were made:—

(1) After the 1850—1851 International Exhibition many specimens were acquired and housed in two large new cases; in this collection was the Howard collection of Cinchonas.

(2) The bulk of the Pereira collection of Materia Medica, some 500—600 Specimens, was transferred to the Museum in 1850—1852.

Jonathan Periera had been apprenticed to a Mr Latham, apothecary and naval surgeon of City Road and qualified as a licentiate of the Society of Apothecaries in his 19th year and a member of the College of Surgeons at 21. Appointed to the Aldersgate Dispensary he became Professor of Materia Medica in the London Hospital (1832-1851) and Professor of Materia Medica in the School of Pharmacy (1843—1852) as well as F.R.S. (1838). This remarkable man's collections were transferred from the London Hospital.

Pereira was the authority on Materia Medica having written and published in 1839—1840, at the age of 36, the "Elements of Materia Medica", a two-volume work which was pre-eminent in its field. He died at the early age of 49 in 1853.

(3) In 1863 a further collection of drugs was obtained from the 1862 International Exhibition and included drugs from Turkey and Manila.

The association of Redwood and Pereira terminated on the latter's retirement and Robert Bentley had succeeded Dr Anthony Todd Thomson as Professor of Botany in the School in 1859. On Pereira's death Bentley became Professor of Materia Medica as well, holding both positions until 1887.

Bentley, born in 1821, was apprenticed in Tunbridge Wells and like Redwood, had been an assistant to John Bell. Attending the first session of studies at 17, Bloomsbury Square in 1842, Bentley won the first botanical prize awarded by the School and then studied medicine at King's College, becoming a member of the College of Surgeons. He subsequently also became Head of the Botany faculty and dean of the Medical School at Kings College as well as chairman of the garden committee of the Royal Botanic Gardens, Regents Park.

When Theophilus Redwood became Professor of Chemistry and Pharmacy in the School in 1864, Bentley assumed the part time curatorship until 1868 and seems to have held many appointments concurrently. Bentley's publications included the "Manual of Botany" (five editions between 1866 and 1887), a "Textbook of Organic Materia Medica", and with H. Trimen "Medicinal plants", a 4-volume work published in 1880.

During the period 1868—1872 the Society decided to appoint a full-time curator and 3 or 4 people held the appointment. The best known was James Collins who was not a pharmacist and was apparently dismissed as being not too satisfactory. Collins was keener on scientific investigation than on dusting and labelling bottles and paid the price!

In 1872 an important appointment was made. Edward Morell Holmes who qualified as a pharmacist in 1864, accepted the curatorship and relinquished it 50 years later in 1922, retiring as Emeritus Curator until his death in 1930 at the age of 87. Although the Museum had functioned as a source of lecture samples for the teaching role of the Society's activities, Holmes realised that this was detrimental to its usefulness to members and researchers alike. A museum that is constantly raided is not a museum for long. Therefore, in agreement with the Council, he divided the collections into two, one being the School collection and the other the Museum collection. Thus Holmes was able to develop and expand his Museum, so making it one of the finest collections in Europe and useful for reference and research.

Specimens came from exhibitions and industry. Holmes catalogued the collections and the catalogue, with notes on the specimens was published in 1878. Additions were recorded in the Museum Reports of 1895, 1903, 1907 and 1910.

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It was during Holmes' tenure of office the Society received the Hanbury collections, donated by Thomas Hanbury after the death of his brother Daniel, a keen botanist who had travelled widely in Europe, the Near East and the Far East and had published over 200 papers on the origin and methods of preparation of drugs he had encountered. His collections comprised some 550 specimens of Materia Medica and 610 herbarium sheets, many of which were the source materials described in Hanbury's "Pharmacographia".

The 1878 catalogue of Materia Medica was arranged according to Bentley's "Manual of Botany", which was taxonomic, but the reference collections were housed according to their country of origin, and under each country they were arranged in morphological groups (leaves, fruits, seeds etc.). The students collections of commonly-used drugs was also arranged morphologically. The British Herbarium and the Herbarium of Medicinal Plants were kept separately. They were named after the Bentham and Hooker system but were arranged in alphabetical order.

Holmes published numerous works, including some 600 articles on Materia Medica, botany and allied subjects in the *Pharmaceutical Journal.*

Henry George Greenish, son of a former President of the Pharmaceutical Society, was appointed Professor of Materia Medica and Pharmacognosy in 1890 and, on Holmes retirement in 1922, became curator of the Museum until 1927. Greenish's published works included "Textbook of Materia Medica", (6 editions, 1988—1933), "Microscopical examination of foods and drugs", (3 editions, 1905—1933), and, with Eugene Collin, "Anatomical Atlas of Vegetable Drugs", (1904). All are still very useful reference volumes.

During Greenish's curatorship the Ransom Scholarship became associated with the research activity of the museum. Two of the Ranson scholars were well-known to us, Mr C E Maplethorpe and Mr G R A Short.

In 1919 Thomas Edward Wallis was appointed lecturer in botany when he was 43 years old. He had already worked under Greenish as a demonstrator and as an analyst under Thomas Trickle in Exeter. Wallis returned to the School of Pharmacy to commence an outstanding career in pharmacognosy, which was really established by his discovery of the lycopodium spore count method of quantitative microscopy in the period 1919—1921. Wallis was Reader in Pharmacognosy in the University of London from 1926—1946 and gained his D.Sc. in 1943 at the age of 67 years. He became Curator in 1927 and served until 1946, then retiring to become Curator Emeritus until his death in 1973. Wallis published over 70 research papers and several textbooks of pharmacognosy.

Dr Jack Morris Rowson became curator in 1949 and the trend of research shifted from the microscopy studies of the Wallis era to investigations of the occurrence and biogenesis of plant constituents, a line of research also being followed by Dr James Wight Fairbairn (appointed Reader in Pharmacognosy in 1952 and Professor 1960). Rowson remained at the Museum until 1957 when he took over the Headship of a Nigerian School of Pharmacy, returning to Bradford University as head of the School of Pharmacy in 1960.

No further full-time curator was appointed so Wallis returned as Emeritus Curator until the Museum was transferred to the University of Bradford in 1969 where it remains.

Since its arrival in Bradford the collection has been thoroughly cleaned, frequently relabelled and recatalogued.

(Abstract from a paper presented at the Spring Conference).

Yorkshire Apothecaries

by DR S. ANNING

In the 18th Century, there were three kinds of medical practitioner: physicians, surgeons and apothecaries. To practise as a physician it was necessary to become a Doctor of Medicine of a University. The early physicians at the Infirmary at Leeds, founded in 1767, were graduates of the Universities of Edinburgh or Leyden. To become a surgeon required a seven years' apprenticeship to an apothecary-surgeon, usually commencing at the age of 14 years, followed by one or two years "walking the wards" at a hospital and observing and assisting at "capital operations"! The apothecaries were similarly apprenticed but did not usually seek hospital experience in their training.

Information is limited but according to the unofficial medical register of 1778 the number of surgeons and apothecaries in certain towns in the district was: Leeds nine, Doncaster four, Halifax and Hull three each. In the register of 1780 the number for Leeds was eight. From Baines's directory of Yorkshire published in 1822 we find the number of surgeons and apothecaries in various places to be as follows: Leeds 32, Bradford eight, Doncaster eight, Halifax ten, Keighley four, Knaresborough five, Pontefract four, Ripon six, Rotherham six, Selby four, Sheffield 30, Skipton five, Tadcaster four, Wakefield 12, York 21 (and 23 Chemists and Druggists), Hull 27. The increase in some of the places was related to rise in population. For example, that of Leeds increased from about 17,000 in 1775 to 82,000 in 1838. In the *Leeds Directory* of 1847 there were 62 described as surgeons, mostly in modern parlance, general practitioners. The *bona fide* surgeons, on the staffs of hospitals as such, were mostly also in general practice at that time. Only the physicians remained a distinct group.

William Hey (1736-1819) was an outstanding citizen of Leeds. A surgeon with a national reputation, he was one of the founders of the General Infirmary at Leeds and was twice Mayor of the town. He was well known for his piety and good works. Hey was born in Pudsey where his father, Richard Hey, was a drysalter. For several generations the prosperous Hey family had been the only drysalters in the town, selling oils and chemicals used by rural clothiers in the Aire valley. William's mother Mary, who married her husband in 1730 at the age of 28, was the daughter of Jacob Simpson, Apothecary-Surgeon, practising in the Upper Headrow in Leeds. Richard and Mary had five sons and three daughters but one son died as a boy. William was the third son. The other three brothers were "long known in the University of Cambridge" and one, Samuel, became Vicar of Steeple Ashton in Wiltshire and another, Richard Hey Esq., LL.D. lived in Hertfordshire. John, the second but eldest surviving son, became Fellow and Tutor of Sidney Sussex College, Cambridge and he was the first Norrisian Professor of Divinity in that University.

When he was between seven and eight years of age William Hey was sent, with his brother John, to an academy at Heath, near Wakefield. He stayed there for seven years and acquired a taste for natural philosophy and became proficient in French which was useful to him later as at that time France led in medical research.

William Hey wanted to go to sea but submitted more readily to the wishes of his parents that he study medicine in the hope that later he might become a naval surgeon. In 1750 he was apprenticed to William Dawson who practised as an apothecary-surgeon in Kirkgate, Leeds. Dawson was aged 33 and had recently married the daughter of the Vicar of Giggleswick.

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William Hey completed his apprenticeship in June 1757 when nearly 21 and could have become a naval surgeon without further training but his father insisted that he complete his education as a surgeon by "walking the wards" of a hospital. He therefore went to London in the autumn. He finished his studies in London in the spring of 1759 and his father suggested that he should continue them in Paris but it appears that William was averse to this plan because of the moral dangers associated with the French capital. He therefore returned to Leeds in April 1759 to start in practice in which he became most successful. He became F.R.S. in 1775.

Charles Turner Thackrah, born near Leeds on May 22, 1795 was the son of George Thackrah who practised in Leeds as a chemist and druggist, and who died and was buried at Thorner in 1829. Charles went to school at Bardsey, Liversedge and Halifax successively. In 1811 at the age of 16 years he entered into an apprenticeship for a period of five years with Mr Obadiah Brooke, an apothecary-surgeon who practised at North Bar, Leeds. As part of this apprenticeship he attended the General Infirmary at Leeds as a pupil throughout 1814. On October 4, 1815 he entered Guy's Hospital as a pupil. He was taught by Astley Paston Cooper, a distinguished surgeon who asserted that "a surgeon should have an eagle's eye, a lady's hand, and a lion's heart." In 1815 Thackrah who had joined the Guy's Physical Society, won its annual prize for an essay on diabetes. On April 5, 1816 after examination he was granted the diploma of membership of the Royal College of Surgeons of England and on June 1, 1816 became Licenciate of the Society of Apothecaries.

Early in 1826 he established a private school of anatomy at 9 South Parade, Leeds. However it was never recognised by the College of Surgeons of England and Thackrah together with other medical men founded the Leeds School of Medicine in 1831.

In considering "Yorkshire Apothecaries" it is necessary to mention the apothecaries of the General Infirmary at Leeds. They provide a special group of apothecaries and were essentially resident medical officers of the institution.

On August 14, 1767 a few weeks before the Infirmary was opened, William Thomas Trant, aged 19 years, was chosen for the office of apothecary at the salary of £15 a year with board and lodging. Trant was the first of a succession of 25 apothecaries who for nearly a hundred years played an important part in the work of the hospital. In 1860 the title of the appointment was changed to that of Resident Officer at the time that Thomas Richard Jessop, later to be father-in-law to the first Lord Moynihan of Leeds, was elected.

The early apothecaries of the Infirmary had no licences or diplomas. Membership of the Royal College of Surgeons of England was instituted in 1800 and the examination for the Licentiate of the Society of Apothecaries was ordered, by the Apothecaries Act of 1815. W.T.Trant and his successors would have been apprenticed seven or five years to an apothecary, but details are not available. William Carr (appointed in 1774) had been apprenticed to W.T. Trant but, as the latter in 1770, Carr can only have been apprenticed four years unless he had served with another master first. Mr Trant was paid two guineas as a gratuity for the attendance of his apprentice as Apothecary to the Infirmary.

The first qualified apothecary to be appointed at the Infirmary was Richard Farrer who had become M.R.C.S. and L.S.A. in 1826 just before he was elected. Thereafter all the apothecaries were qualified men.

The Rules and Orders of the Infirmary laid down in July 1767 stated "That the Apothecary fix a Ticket on each Patient's Bed, specifying the Name of the Patient, together with that of the Physician or Surgeon, the Time of Admission, and also the Diet, according to the Prescription of the Physician or Surgeon; and that he give a List of the same to the Matron each prescribing Day."

Annually the apothecary had to make an "Inventory of the Shop goods, Utensils and Surgeon's Instruments including Druggs" and to sign the same. A committee was appointed in 1770 for buying drugs but the apothecary was empowered to provide any that were necessary. It was ordered that "he deliver to the Weekly Board an Account of what Drugs are expended, and that he bring in a Bill of the Expence, at least once in every Month." This bill for "Apothecary's Incidents" was rarely stated in the minutes in detail but on the first occasion, in December 1849, it included £6, 19s 3d. for leeches.

Many of the apothecaries, on appointment, had to give an undertaking to stay three or five years and sometimes the appointment went to the candidate prepared to stay the longest time. Of the 25 apothecaries eleven stayed two or three years and six, four to seven years. Mr Allanson (appointed in 1833) seems to have been content to make the office his career for he remained no less than 19 years. The other seven stayed one year or less, some resigning from ill-health. The shortest period was served by Anthony Dempster who was discharged five weeks after his appointment in January 1774: "It having appeared to this Board that Mr Dempster the Apothecary have missbehaved himself to the Female Servants of this House."

The new Infirmary, opened in 1868 by the Prince of Wales (later King Edward VII) is of interest to pharmacologists. It was designed by George Gilbert Scott who came fresh from his triumph at St Pancras Station and produced a rather similar building. In the entrance hall the carved stone supports for the roof, about 40 in number and each different, depict various medicinal plants in use at that time.

To conclude this consideration of Yorkshire apothecaries I must mention some royal apothecaries and declare my debt to Leslie G. Matthews. George Shiers was apothecary to James I from 1603. Whether he was a true Yorkshireman I do not know but he owned the manor of Kirby Misperton in Yorkshire. John Gowland served his apprenticeship in York, set up in London, was appointed apothecary to George III in 1761 and held the post until his death in 1776. Richard Walker, senior, (1750—1817) was born at Birstall in Yorkshire and was apprenticed to William Hey when he was 14. He went to London and became one of two apothecaries to the Prince of Wales. His son, Richard Walker, junior, was not strictly speaking a Yorkshireman by birth but he became apothecary to George IV in 1820.

I end this account of Yorkshire apothecaries on a personal note. My father, James John Anning, was born on August 24, 1871. On August 10, 1885, when almost 14, he became a pupil or apprentice of Edward Brown a chemist in Leeds.

Between 1884 and 1889, that is during his apprenticeship, my father passed examinations at the Science and Art Department, South Kensington and Magnetism and Electricity, Inorganic and Organic Chemistry. He then went to Edinburgh to study pharmacy but for how long I do not know. He then opened a shop, probably taking over Brown's business, as a pharmaceutcal chemist in Woodhouse Lane, Leeds about 1896. Soon after, and with a wife and child, he managed, how I do not know, to make a success of the business and become a medical student at the same time. He became L.S.A. in 1902 and went into general practice. Between the two world wars he was lecturer in pharmacy at the University of Leeds.

About 1900 he had taken W T Castelow as a pupil and this remarkable man continued the business until he died in 1974 at the age of 98. Britain's oldest practising pharmacist. I used to call on him. In 1973 when I last saw him he was amazingly alert, still wearing a stock and a maroon coloured waistcoat with brass buttons. The contents of the shop, virtually unchanged since my father's time, in the same place, has been reconstructed at Hull Museum.

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A Brief History of Lanolin

by E.W. CLARK

Discorides, was the first to describe a method for recovering a partially purified wool wax from wool washings. He repeatedly poured the liquid from a height into a receptacle until a good head of froth had developed, and then allowed it to stand whilst the froth subsided, whereafter a layer of wool wax remained floating on the surface ready for skimming off. In his book "Materia Medica", Discorides gave his produce the evocative name "Oesypus", and this word, or derivatives of it such as Oesypum or Hyssopus became widely established, and used by other ancients such as Plinius the Elder, also by Celsus in his book "De Medicina", and by Galen during the 2nd Century A.D.

Oesypus was included in the Dispensarium Coloniense of 2565, and in a German translation in 1694 of the Pharmacopoeia Augustana, also it was official in the Spanish Pharmacopoeia about 1700. In England in 1675 Culpepper described, almost in the same way as Discorides, how wool wax could be washed from wool with hot water.

However, in the early part of the 19th Century wool wax was not much referred to, perhaps because of industrial developments which led to wool being washed, not just with water, but also with added soap and alkali. This made wool wax much harder to recover, because it was then in the form of a relatively stable emulsion. But ingenuity prevailed, and a process termed "acid-cracking" was discovered whereby the wool washings, or to use the trade term, spent scouring liquor, was acidified with sulphuric acid. This broke down the soap and destabilized the emulsion which, on standing, deposited a sludge comprising wool wax and soap fatty acids bound up with insoluble sand and dirt. This sludge acquired the name "magma", and it could be heated and filtered to recover the wool wax content, or solvent-extracted. The resultant product was called "acid-cracked wool grease", and it was very dark in colour, odorous and of high acid value, up to 50 or so.

A major milestone in the history of lanolin, and indeed the point in time where the word "lanolin" first came into being, was a German Patent No. 22516 dated 1882 in the name of Otto Braun of Berlin, and a corresponding English Patent No. 4992 the same year by Braun and Liebreich. Lanolin also appeared as a trade mark in print in 1903:— "Gesunde Haut durch LUHNS LANOLIN-SEIFE" registered by Aug. Luhn & Co. G.m.b.H., in Barmen; in 1904:— "LANOLIN Toilette-Cream" was registered by Vereinigte Chemische Werke A.G., in Berlin-Charlottenberg, this company becoming in 1931 Pfeilring-Werke A.G.

Earlier Trade Marks for "Neutrale Wollfette und daraus hergestellte Produkte fuer kosmetische und pharmazeutische Produkte" in the form of the words "GOLDENES-VLIESS", and an accompanying device of a suspended sheep, were registered as early as 1882 by Woll-Waescherei und-Kaemmerei in Doehren bei Hannover.

Otto Braun's patent described his discovery that wool wax could be recovered by centrifuging the spent scouring liquor. The resultant wool wax is purer, paler in colour and less odorous, and is usually called "centrifuged wool grease". Braun described the partial purification of his centrifuged wool grease by repeated kneading and washing with water. He ended up with a stable, w/o emulsion of wool fat to which he gave the name "Lanolin".

This original centrifugal process, was fraught with difficulty. The centrifuges used at the time were continuously fed with scouring liquor, and discharged through two outlets, one for light wool wax and the other for the heavier, de-waxed liquor. However, the feed contained much suspended solids of high density and these, under the influence of several thousand "g's", were flung to the outside of the solid bowl and rapidly built up until they blocked the outlets for wool wax and spent liquor. The machine then had to be stopped, stripped and cleaned, with the result that production runs were short, sometimes only minutes, and therefore labour intensive and costly. This penalty was sufficient to discourage the centrifugal recovery of wool wax on a large scale until 1928, when James Walter Adams, at that time chief engineer of the Woolcombers Ltd. Bradford, had the idea of providing the centrifugal bowl on its periphery with drillings containing angled nozzles, which discharged continuously the solids flung to the outside of the bowl, preventing them building up and enabling the centrifuges to run hours or days at a time without stopping. This discovery was a turning point in the industry, and from then on the trend was for acid-cracking graduallo to be replaced by centrifuging, so that nowadays almost all pharmaceutical lanolin is refined from centrifuged crude, because of the quality of the end product.

Large-scale recovery of wool wax and lanolin production was first begun in Germany about 1882 by the Wollkaemmerei Doehren, and in 1888 by two other companies: Lanolin-Fabrik Benno Jaffe und Darmstaedter in Martinikenfelde-Charlottenburg, and Bremer Wollkammerei in Bremen — Blumenthal. Nowadays, however, no pharmaceutical lanolin is produced in Germany, although a semi-refined wool wax is made by Bremer-Wollkaemmerei.

In the U.K. in the 19th Century Bradford was the major world centre of the wool industry, and huge quantities of wool were scoured in the mills of the city, about one fifth of the total world clip. Vast volumes of spent scouring liquor, containing about 40 tons a day of wool wax, were discharged, untreated, into the Bradford Beck, the River Aire or the Bradford Canal, the latter becoming so septic that large volumes of methane and hydrogen sulphide were evolved, and in the early 1960's it was reportedly easy to set the canal on fire.

Eventually, as a result of legislation in the late 1880's, the polluting liquors were diverted to the Bradford Corporation's sewage works at Esholt where, after an initial period in which various methods were used, an extensive acid-cracking process was instituted in 1901 to extract grease from the whole of Bradford sewage, a volume of 20 million gallons daily! The huge plant occupied 800 acres. The grease was very impure, containing many fats other than wool wax, but there was a lot of it, 6000 tons a year being extracted in 1879, and it found many industrial outlets both in its natural form and also after conversion to derivatives. This business continued right up to 1977, when the wool wax content of the Bradford sewage had fallen so low as a result of the contraction of the local wool industry that extraction at Esholt ceased, the sewage being then amenable to normal biological purification. The Esholt grease was totally unsuited for refining into pharmaceutical or cosmetic lanolin.

Returning to true wool wax, for some years before the Esholt operation commenced a number of private firms in the area were recovering wool wax on a substantial scale. Lewkowitsch reported in 1892 that 10,000 tons of wax a year were being produced. In the mid 1920's, a Bradford company, Woolcombers Ltd., developed its own wool wax recovery and lanolin business, firstly using the acid-cracking system and subsequently changing over to the centrifugal process, preceded by a novel 5-stage vacuum concentration plant to increase wax recovery. In 1947 a subsidiary of this firm was set up, named Westbrook Lanolin Co., to specialize in wool wax and lanolin products. By 1953 the production of high quality pharmaceutical lanolin by this company exceeded that of any other producer in

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the world, and this is still so today. There is also a second manufacturer in the U.K., Croda Chemicals Ltd., of Goole, and other smaller U.K. firms have had their place in history — Adeps Lanae Ltd., The Pharmaceutical Lanolin Co. Ltd., Pura-Lanolin Ltd., and Cirolanum Ltd. Many other countries nowadays have an indigenous lanolin industry, for example the U.S.A., Japan, Australia, New Zealand, France, Belgium and Russia, but the quantities and qualities produced vary enormously.

Braun's purified wax emulsion, lanolin, was popularised in pharmacy and dermatology by the German pharmacist Oskar Liebreich, and in 1900 the substance became official for the first time in both the DAB 4 and the 1890 Addendum to the BP 1885 Edition. In the B.P. the principal name was Adeps Lanae (Wool Fat) for the anhydrous substance, and Adeps Lanae Hydrosus (Hydrous Wool Fat) for the aqueous emulsion.

The Hamburg dermatologist, P.G. Unna, about 1890, was amongst the first to recognise two advantages of lanolin in ointment bases, namely its "inertness" as he called it, and its high water absorption power.

During subsequent years, as reported by D.I. Lifschuetz, Hamburg, in 1923, certain disadvantages of the relatively crude lanolin available in those days were recognised. Firstly it was relatively stiff to apply, tacky on the skin, and liable to autoxidation. Moreover, the early lanolin contained impurities that could reduce silver and mercury compounds contained in ointments to the metallic state. An attempt partially to overcome these disadvantages was made in 1896 by F. Miehle, who found that mixing 10 parts of lanolin with 90 parts of paraffins gave an easily applied, highly water-absorbing ointment base that he named Unguentum Molle, and this became included in the DAB 5 under the rather misleading name Unguentum Paraffini. Later developments were the production of ointment bases not from lanolin itself but from the unsaponifiable fraction of lanolin plus paraffins. Such a mixture was named "Eucerin" by Unna in 1907, and its modern equivalent is Wool Alcohols Ointment B.P., containing 6% of wool alcohols, i.e. the unsaponifiable fraction of lanolin.

Since those early days lanolin has become a monograph in the pharmacopoeia of every major country but no two specifications being alike, causing difficulties to the manufacturer. There have been progressive improvements in the quality and purity of the substance, with frequent revision of monographs. The latest monograph is due to be published some time this year in the European Pharmacopoeia.

Much progress has been made in elucidating the chemical composition of lanolin, starting with the pioneering work of Chevreuil, Hartmann, Schulze, Lewkowitsch, and Darmstaedter and Lifschuetz over the period 1856 to 1896. This early work established the high sterol content of wool wax, and absence of glycerides. In 1945 Weitkamp made a detailed analysis of the fatty acids of wool wax, a remarkable achievement for the techniques of the day, considering the complexity of the substance. Since then many workers have elaborated the picture. The most recent analyses by Chemtob, also Fawaz, used GLC of derivatives of the lanolin alcohols and lanolin acids.

In 1960/61 work in Bradford by Clark and Kitchen on the autoxidation of lanolin and lanolin alcohols led to recommendations of suitable antioxidants that would inhibit surface oxidation for up to two years, these recommendations being later adopted by the B.P. and the Nordic Pharmacopoeia.

In addition to work on the analysis and improvement of lanolin itself, over the years a vast range of lanolin derivatives have been developed, using both chemical and physical processing methods, so that the total number of lanolin types and derivatives now on the market is estimated to be about 200.

(This and the following are Abstracts from papers presented at the Spring Conference).

Some Yorkshire Proprietaries

In his miscellany of "Some Yorkshire Proprietaries" Mr A. Wright reminded pharmaceutical historians that the implementation of the Medicines Acts would bring about the disappearance of an increasing number of preparations. "We must ensure that steps are taken so that a lot of pharmaceutical heritage is not irretrievably lost" he said.

After reviewing some pharmaceutical advertisements Mr Wright turned to Hull, an important area of pharmaceutical activity.

There was Smith & Nephew, active in dressings and plastics and British Cod Liver Oils Ltd with its "tasteless" cod liver and halibut liver oils issued under the Seven Seas trademark. Theirs was a unique story of product development. The Reckitt & Colman story was a relatively recent one for that company did not move into pharmaceuticals until 1930 or 31. Nevertheless, within four years they introduced Dettol and Sanpic, both extremely successful preparations. The impact of Dettol on midwifery was well known. Another product, Disprin, did not come until later. Research for that product began before the 1939—45 war and there was a very useful record of its progress in Peter Fairley's "The Conquest of Pain", that author having had the advantage of Colman Green's story of the problems overome during the initial production stages.

Thornton & Ross Ltd of Huddersfield, was another relatively modern company founded in 1922 by the late Nathan Thornton and Philip Ross to manufacture liquid soaps and disinfectants. Later they expanded into "pharmaceuticals", specialising in producing goods under chemists own name. Their "Samaritan" trademark, first applied to olive oil and later to different classes of goods, was extremely well known.

Nurse Harvey's Gripe Mixture was formulated by Mr Arthur Oglesby around 1888. Arthur Oglesby had a shop at 21 Cheapside, Barnsley and he was registered as a chemist and druggist in 1887. In those years manufacture was carried out at the back of the shop. He offered a number of preparations but gripe mixture sales expanded rapidly. At the time he thought that his formular to "cure" a cough would prove to be a winner, but it was the gripe mixture that was the most successful. In 1907 the company moved to York, mainly to take advantage of the rail network.

It remained an independent family business with three generations of the Oglesby family spanning the 92 years.

Mr Wright then turned to a family business that had its origins in Leeds and Bradford. In 1849 Dr J.F. White established a wholesale business selling herbs and roots and manufacturing medicines at 17 Vicar Lane, Leeds and at 15 Westgate, Bradford. In 1884 Dr White registered a trademark "Composition Essence" and a few years later the trademark Kompo was registered. Dr White's son, F.A. White, realised the Kompo had a great potential. Father and son went into partnership and bought a jute mill in Benson Street, Leeds. There, Kompo was produced in quantity, and through advertising, distributed throughout the North of England.

Later J.F. White, MPS (Dr White's grandson) carried on the business which was incorporated in 1938, just before he died. A great grandson, J.F.A. White, took over in 1946 and now runs the business. The Kompo formula remained unchanged, although ingredients were now imported from different parts of the world.

In 1897 the late Charles E. Fulford founded in Leeds the company which bore his name until the take-over by Fisons early in 1964 (the company was registered as C.E. Fulford Ltd in 1906). Mr Fulford was of Canadian origin from Brockville but spent some time in Australia, where with a partner, Ernest Albert Gilbert, he launched "Charles Fordes Bile Beans for

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Billiousness''. The Bile Beans were made from a formula drawn up by Mr Fulford. At first manufacture was undertaken by an Australian compano but when it could not cope with the demand Parke Davis & Co, Detroit, undertook the task, presumably on a contract basis.

The business was built up on extensive sampling, advertising and leaflet distribution. The claims were that a certain Charles Ford, declared to be a skilled scientist, while in Australia had noted that Aborigines were remarkably free from body ailments, and by research he had ascertained the immunity was obtained by the use of a natural vegetable substance. ''As a result of this research this wonderful remedy was now given to the world.''

Inevitably the success of the Fulford operation attracted imitators and court proceedings were instituted in a number of alleged infringement and substitution cases. In one, involving George Graham Davidson, chemist, Edinburgh, the result went against Fulford and his partner. It was taken through to the Court of Session, Edinburgh. The defendant had sold his pills as ''Davidson's Bile Beans''. The partners sought an injunction and claimed an exclusive right to ''Bile Beans''. Lord Ardwall in September 1905 refused the interdict giving the defendant costs. He was extremely scathing in his judgment, saying:

''There was no such person as Charles Forde, his true name being Fulford. He was not an eminent scientist, having had no scientific training and no standing whatever as a chemist or anything else; he never investigated the healing extracts and essences of Australian roots and herbs; he never made any research; he never was the discoverer of a natural vegetable substance which had the power of acting in the same way as animal bile, in fact no such substance existed and no such substance formed the basis, along with other ingredients, of Bile Beans...

''There was therefore no doubt in his mind that the business was founded entirely upon fraud, impudence and advertisement''.

Later he said the Court was bound to take notice of the fact that the two words ''Bile Beans'' had been used in connection with a fraudulent trade and no action ought to be entertained by a Court of Equity to protect the mark.

At the appeal, July 1906, Lord Justice Clerk upheld the earlier decision saying the evidence disclosed the history of a gigantic and too successful fraud. Mr Gilbert died a little time after the first judgment was given and Mr Fulford, aged 37, died after the second case. Fulford's executors and trustees took steps to appeal to the House of Lords but later they withdrew.

The Scottish case must have only been a temporary set back to the company for in the 1930's Bile Beans became a brand leader in the laxative market and world wide sales were over 1 million pills or beans a day. Bile Beans were not Mr Fulford's only success. In 1903 he introduced a ''herbal'' prescription claimed to have been successfully used by a former officer in the Indian Medical Service. It was Zam Buk ointment. Again extensive advertising and the distribution of booklets to almost every home in the country ensured Zam Buk became a household name. The BMA publication ''Secret Remedies'', 1909, noted that in a package circular there were claims that Zam Buk has proved itself to be unequalled for cuts, bruises, burns and scalds etc, etc, etc, — listing another 59 afflictions! Another speciality, launched in 1906, was PEPS — a cough tablet with emphasis on the pine oil content. That product became a far better seller overseas than ever it did in this country.

In Leeds there were a number of pharmaceutical companies that were thriving in the 18-1900s. Hirst Brook & Hirst, Goodall Backhouse & Co, Wharam Ltd, and of course Reynolds & Branson and Thackrays. ''I would like to dwell on one of these — Goodall Backhouse & Co., whose Yorkshire Relish is very much a Yorkshire proprietary with a strong pharmaceutical base'' said Mr Wright.

The origin of the name ''Yorkshire Relish'' was lost in the mists of antiquity. The earliest reference to the name appears in the Yorkshire Archeological Pipe Rolls — the records of the old National Exchequer Offices — for the reign of King Richard II (1377—1399). It is believed hat a Yorkshire Relish was a household condiment which had been used and handed down through many generations.

In 1837 Mr Robert Goodall, who at that time was a pharmaceutical chemist in Market Weighton, commenced small scale production of a family recipe for Yorkshire Relish. He moved to Leeds in 1853 where he took over a retail chemist's establishment. Amongst other activities he continued to produce Yorkshire Relish in the basement of his premises. He found there upon arrival a large Willow Pattern Plate and decided to use it as his trademark.

In 1857 Mr Goodall took over a large retail pharmaceutical establishment in central Leeds and simultaneously entered into a partnership agreement with Mr Henry Backhouse and Mr William Powell, both of whom had a pharmaceutical background. Mr Powell was a nephew of Mr Goodall. Henry Backhouse lived at No. 2 Back of Shambles whilst Powell and Goodall probably lived in Boar Lane. During 1868 the partnership acquired a site in White Horse Street and commenced building a factory and offices. Two years later Goodall died and it seems that Powell became the dominant partner.

The business was transferred to the new White Horse Street premises in 1873 and the retail side of the activities was discontinued. From that time onwards the business consisted of the production of Yorkshire Relish and a number of pharmaceutical preparations. There was also a large department making tin box containers.

Mr Backhouse died in 1876.

With the growth of the business additional factory premises were required and the property in Sovereign Street, Leeds, was purchased in 1877. In that year Mr William Powell Bowman (Mr Powell's nephew) joined the partnership.

During 1888 the ''Chemist & Druggist'' described the premises of the company, a fascinating report, not only for the details given but also for the journalistic style of that day.

''In all there are eight acres of floor space in Messrs. Goodall Backhouse & Co's premises, and the whole of these eight acres are either filled with stock or are scenes of busy life more or less closely associated with the drug trade...scores of girls being busy here with various kinds of goods'' but the centre of attraction is the bottling of ''Yorkshire Relish'' which we suppose has been going on at the same or at an extended pace every day since we watched it fifteen years ago...The bottling is done from a vat holding 1,100 gallons''.

We are also told that at that time the company spent £30—40,000 a year ''putting their household specialities before the public''. They had nearly 400 employees. Returning to the chronological events, in 1900 Mr Powell died. Mr G.E. Bowman (a son of Mr William Powell Bowman) joined the firms in 1922. Ten years later Mr J.F. Simon, pharmacist and chief chemist, was largely instrumental in introducing Yorkshire Relish Thick Sauce. The business was incorporated as a private limited company in 1934 but in 1937 the company sold the premises in White Horse Street and also disposed of all its pharmaceutical interests.

Mr W.P. Bowman Junior (a son of Mr G.E. Bowman) joined the company in 1952. In 1955 Mr W.P. Bowman Senior died and in 1959 the Bowman family disposed of all their interests in the company to Hammonds Sauce Co. Ltd., of Shipley.

In many ways that was all that needed to be said about ''Yorkshire Relish'' — but the product had achieved significance in another area. It was often quoted in tradmark case law.

Briefly — the Trade Mark Act of 1888 apparently prevented the registration of any geographical name as a new trade mark, and therefore Mr Powell had had problems when he tried to use

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the trade mark procedure to establish his sole title to "Yorkshire Relish".

The Birmingham Vinegar Brewery Co took the view that as the Trade Mark law said this title was not registered and not registerable, it was common property. They issued a preparation under the title Holbrook's Yorkshire Relish, whereupon Mr W. Powell decided enough was enough and took legal action.

Before the Trade Marks statutes Mr Powell could have applied for an injunction and if he could prove that he had created a property in the title and someone was unfairly using the mark, he would have got his injunction. There was no doubt that proof of the sale of hundred millions of bottles of sauce would have made his case. However, the new Trade Mark law had to be tested to see what could or could not be registered and the result was the case went through all stages — the Comptroller, Board of Trade, Chancery Division, Court of Appeal and finally the House of Lords, where he won his case.

Commenting on the case, the *Chemist & Druggist* of 1897 said: "Truly this is a lovely law-ridden country". That statement was just as applicable today and much trade mark law was based on the findings in Powell v. Birmingham Vinegar Brewery Co. "In fact" said Mr Wright "if you pick up a trademark text book you will find a number of pharmaceutical company names cropping up in different cases."

Izal disinfectant was for many years offered by Newton Chambers, Sheffield, but recently it had travelled a complex path through the Company Registrars Office, ending with Sterling Research Laboratories.

Much of the early pharmaceutical history of Sheffield was found in John Austen's book "Historical Notes on Old Sheffield Druggists". And there on page 2 was a reference to Dr James Fever Powder — a patented antimonial compound and a fashionable medicine of the 1760's and 70's. Elsewhere Austen mentioned Ropers Royal Bath Plasters and Ropers pills. Jem Cooks Horse Powders were sold by Rupert Roper from 5 Broad Street, Park, Sheffield.

"Blattis" Cockroach Paste was sold in large quantities to workhouses. The Blattis trademark was registered by Howarths, 473 Crooksmoor, Sheffield, in 1933.

In his notes John Austen referred to a John Acton druggist in Union Street who kept a record of his daily activities. The entries give a good idea of the work done in his shop — and presumably others in the earlier 19th Century.

On December 9 1836 Acton wrote:—
"I went to Pontefract and bought 28 lb. stick liquorice, 28 lb. powder liquorice and 14 lb. refined liquorice and Pontefract cake mixed."

Mr Wright continued "Pontefract cakes are indeed a Yorkshire speciality and I do not think I need to apologise for including them on this occasion."

Liquorice plants had been grown in the Pontefract area since the 16th Century. Pharmacographia, Fluckiger & Hanbury 2nd edition states: "The cultivation of the plant in the North of England existed at the close of the 16th Century, but how much earlier we have not been able to trace."

The accounts of Henry III in 1264 showed liquorice costing threepence a pound and in the second half of the 14th Century Chaucer included a number of references to the root in his works.

These and early references in China and Greece are recorded in Dr Houseman's Streatfield Memorial Lecture read to the Royal Institute of Chemistry in 1944 and entitled "Liquorice Putting a Weed to Work". It was a wide ranging piece of work covering not only the botanical, chemical, and pharmacological aspects of the plant but also the industrial uses of by-products.

The Cluniac monks introduced liquorice to Pontefract or Pomfret, its earlier name and after the dissolution of the monasteries the farmers of Pontefract continued to grow it. By the end of the 17th Century a great deal of local land was used to grow the plant. It had become of such importance commercially that in 1701 the townsfolk passed a bylaw forbidding the sale of buds or sets to people who did not live in the town. As cultivation expanded so did the local cottage industry processing the extracts. However, during the 17th Century Pontefract liquorice would probably have been only known for its medicinal and thirst quenching properties.

Pontefract cakes as we know them today were attributed to George Dunhill, a local chemist and druggist from the nearby village of Ackworth. Although there were no records to confirm the date, it was generally accepted that around 1760 he hit on the idea of reducing the liquorice content and increasing the sugar content in the recipe, thus changing the medicament into a sweet.

Dunhill's daybooks of 1778 and 1779, which still exist, show many transactions in Pontefract Cakes, "but regrettably there are no known records to indicate how George Dunhill's business then developed". It was known he was succeeded by his son, Francis, on whose death the business was carried on by his widow, Anne.

Later the business was taken over by Mr William Claxton Smith and in spite of two world wars Dunhills Pontefract Ltd were still progressing.

George Dunhill's success encouraged others, among them John Hillaby, said to have commenced in business in 1850. "I have traced a patent granted to him on October 14, 1891. His address is given as Lion Works, Tanshelf, Pontefract, and the patent covers:

"An Improved Composition for the Manufacture of Lozenges".

Mr Wright suggested that the process could be adjusted *secundem artem* to produce a hard or soft product and "one can only surmise from this point in time how the patent was used commercially."

During the early 1960's there were five old established liquorice houses in Pontefract:

Dunhills, already mentioned as founded in 1760;
Ewbanks, founded in 1810;
Hillabys, founded in 1850
Robinsons & Wordsworth, founded 1877 and closed 1964 and
Wilkinsons, founded in 1888.

By 1966, the fields of Pontefract could no longer supply raw material. Most of the supplies of extract were from Turkey and some from China. Today only two cake makers remained — Dunhills and Wilkinsons. Wilkinsons merged with the Sheffield based Bassett Group in 1961, and to maintain the traditional links of plant and town they still carefully tended a number of liquorice plants in the gardens of the Pontefract factory.

Mr Wright finally reminded the audience of John Betjeman's poem — The Liquorice Fields at Pontefract.

He also acknowledged his indebtedness to a number who had helped him in the miscellany.

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The Copperas Trade, 1750—1850

by W.A. CAMPBELL

Sir Kenelm Digby, the former pirate who helped to found the Royal Society in 1662, and who was judged by John Evelyn to be 'an errant mountebank', claimed to be able to cure sword wounds by means of a secret powder. Advertised by Nathaniel Brookes, bookseller in Cornhill, London, as "curing green wounds and toothache", the powder was to be applied not to the wound but to the blade which had caused it. It was later revealed by Digby's assistant George Hartman that the Weapon Salve or Powder of Sympathy consisted chiefly of the sulphate of iron known as green vitriol or copperas.[1] It was this copperas, which Pliny in the first century regarded as a magical curiosity on account of its chemical virtuosity, and which Queen Elizabeth protected with a monopoly in 1565, that was to form the basis of a complex network of industries.

The manufacture of copperas depended on the "ripening" of coal-brasses (iron pyrites found in association with the coal measures). The transformation took place through the influence of air and moisture by the ordinary process of weathering, and the details of manufacture seem scarcely to have changed in three centuries; the description of a copperas works by Agricola in *De Re Metallica* (1556) fits closely with plans and inventories from the 1850s.

Left in the coal, pyrites was a nuisance both to industrial and domestic users; but converted to copperas it became the source of such valuable chemicals as oil of vitriol, Venetian red and Prussian blue, an adjunct to the dyeing, tanning, jewellery, glass-polishing and metal-finishing trades and an important factor in the production of ink, paint, alum and Epsom Salt.

A copperas bed was an area of sloping ground, up to an acre in size, with a surface of beaten clay. Pyrites was spread to a depth of several feet and left to weather for three to five years. The heap was occasionally turned and in dry periods was sprinkled with water. As oxidation and hydrolysis proceeded the pyrites would heat up, swell and deliquesce. The yellow acid liquor which drained from the bed was run off through channels in the clay to a reservoir in which earthy matter settled out. The liquor was pumped to leaden tanks in which it was concentrated by boiling, the acidity was measured by the time taken for the shell to dissolve off a boiled egg, and finally the liquor was conveyed to wooden tanks lined with pitch. Scrap iron was thrown in to restore the green colour and take up the excess acid, and twigs were placed in the troughs so that copperas crystals might grow on them and be easily lifted out.[2]

The crystals were sold to dyers and ink manufacturers, but in the larger works copperas was roasted in a brick oven until oil of vitriol (concentrated sulphuric acid) distilled off, leaving a residue of red iron oxide or Venetian red. There was a ready market for Venetian red as a cheap pigment for the paint industry, but large quantities were also used for polishing sheet glass for windows and mirrors.

By the end of the 18th Century sulphuric acid was established as a key chemical. Samuel Parkes, himself an acid manufacturer, listed the following tradesmen as users of the acid: bleachers, calico-printers, dyers with indigo, brass founders, button makers, japanners, gilders, paper makers, tanners, brewers, oil merchants, fell-mongers, tin-plate workers, and refiners of precious metals.[3] The copperas route to sulphuric acid was cheap. Its chief fault was the years of waiting for the brasses to weather. For this reason copperas manufacturers tended to engage in other trades, often connected with paint or dyeing, such as oil-milling, turpentine distilling, or the preparation of lampblack or vinegar. By far the most common by-trade however was brick and tile making, the clay being associated with the coal in which pyrites was found.

Parkes' list of trades dependent on sulphuric acid did not include the manufacture of Glauber's salt, Epsom salt or alum. About 1624 J.R. Glauber, the self-taught son of a barber, fell ill in Vienna, and was cured by drinking the water from a local spring. The water was salty and laxative, and Glauber was able to extract from it a new salt which he called *sal mirabile*.[4] In 1648 he obtained the same salt from his process for making hydrochloric acid by treating common salt with oil of vitriol; this he did in a vessel which later gave Peter Woulfe the idea for his two-necked "Woulfe's Bottle".[5] The salt was sodium sulphate.

At about the same time, a farmer on Epsom Downs observed that his cows would not drink from a particular spring. Once more the water proved laxative, and the salt isolated from it by the Coventry physician Nehemiah Grew was variously known as *sal amarum catharticum, sal Anglice*, and Epsom salt.[6] It was manufactured by treating the bittern (the mother-liquor remaining in salt pans after the evaporation of sea water) with sulphuric acid, and later — when its constitution as magnesium sulphate was securely understood — from magnesian limestone or dolomite.

The discovery of these two salts had a profound effect on medical practice. Their importance however extended beyond the field of medicine, for Glauber's salt was used in glassmaking and from 1791 was the basis of Leblanc's process for synthetic alkali, whilst Epsom salt, along with alum and copperas, was employed as a mordant in dyeing. During the 1790s the range of mordants expanded to include acetates of iron, magnesium and aluminium, the metals in copperas, Epsom salt and alum. This led many copperas firms to diversify into the manufacture of pyroligneous acid (impure acetic acid) by the dry distillation of wood; among the by-products were charcoal for gunpowder, bark for tanning, and lampblack, resin and turpentine for the paint trade. Copperas was already connected with paint through the pigment Venetian red. A second pigment, Prussian blue, was used not only in paint but for cotton printing thus strengthening further the link with dyeing.

But the net was to be drawn still tighter. Copperas, together with bark, was used in tanning leather, and much spent bark from the tanyards was sold for the manufacture of white lead, itself a staple of the paint industry.

Two nefarious practices consequent upon the copperas trade must be mentioned. The first was the resale of used tea leaves, purchased at negligible cost from inns and coffee houses. The tea was dried, sometimes mixed with other kinds of leaves, freshened with a solution of gum and dusted with copperas; the iron reacted with the small amount of tannin remaining in the used leaves to form a weak ink, giving the illusion of a strong infusion. Mr George Phillips of the Inland Revenue Office stated in 1843 that there were eight establishments in London alone for reclaiming exhausted tea leaves, and several in other large cities.[7]

The second concerned the adulteration, though the trade preferred the term "facing", of China tea; black varieties were

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Abstract from a paper presented at the History Session, British Pharmaceutical Conference 1980.

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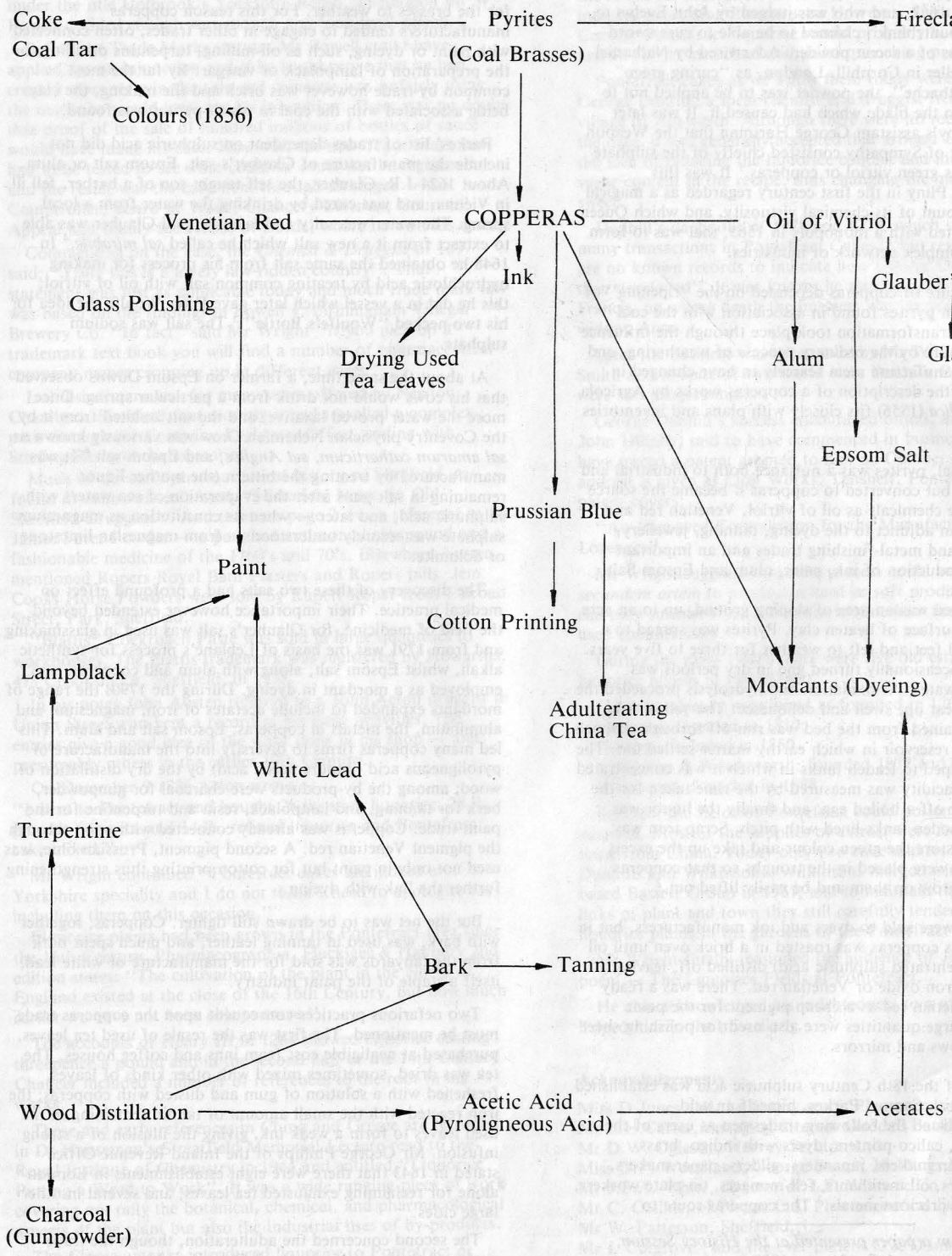
INDUSTRIAL NETWORK BASED ON COPPERAS



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faced with lampblack and green teas with Prussian blue. "An English gentleman in Shanghai, being in some conversation with Chinese from the green tea country, asked them...what reasons they had for dyeing the tea, and whether it would not be better without undergoing this process. They acknowledged that tea was much better without having any such ingredient mixed with it, and that they never drank dyed tea themselves: but remarked that as foreigners seemed to prefer having a mixture of Prussian blue and gypsum with their tea, to make it look uniform and pretty, the Chinese had no objection to supplying them, especially as such teas always fetched a high price." The Prussian blue was exported to China from Newcastle and Liverpool, two seats of the copperas trade.[8]

The heyday of copperas was about 1800, and although isolated pockets survived for another hundred years most factories closed in the 1850s. Two factors contributed to this large decline. Chamber sulphuric acid, made by burning imported pyrites, came to be cheaper and more plentiful than that from roasting copperas; and the demand for Prussian blue fell sharply, at first through the advent of cheap coal-tar dyes after 1856 and later on account of the curtailment of cotton supplies due to the American Civil War. The price of copperas fell from £11 per ton in 1806 to £3 in 1860. Not for the last time, technological improvement in one sphere of industry condemned another to extinction.

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BRITISH PHARMACEUTICAL CONFERENCE 1980

During the conference week members were able to visit the Pybus collection of historic medical books, engravings and manuscript letters.

The collection contains books which span the period from the early days of printing until the 19th century. The collection which is housed in the Newcastle University Library includes books on all aspects of medicine and provides a unique survey of the development of illustrations throughout the centuries.

CHEMIST'S WINDOW

Dr W.E. Court, vice president and other members of the Society were present at the rededication service of the chemist's window in St Nicholas's Cathedral, Newcastle upon Tyne on September 14. The window had been repaired and reinstated following the successful launch of the Austin McGuckin appeal.

SPONSOR

As in previous years the Society is again indebted to R. Gordon Drummond Ltd for sponsoring the History of Pharmacy session at the Newcastle Conference. The company's generous sponsorship also extends to this issue of the Pharmaceutical Historian which includes reports of the session and other BSHP activities at the Conference.

HADRIAN'S WALL

Over 300 slides and a taped commentary transported a large audience on "a Photographic Journey on Hadrian's Wall" during the second half of the British Pharmaceutical Conference 1980 History of Pharmacy Session. Prepared by Councillor W.W. Pope, Newcastle the journey began at the Eastern extremity Wallsend and continued across the country to Bowness.

Mr Pope described the various ways in which the wall was constructed sometimes of turf and sometimes stone, usually with a large ditch in front. "Milecastles" or fortified gateways were built at intervals of one Roman mile with buildings to house soldiers and stores. In between the milecastles were observation towers.

The fortified gateways allowed the local farmers and others to pass through from one side of the Wall to the other, presumably after receiving the approval of the guards. Also spaced along the Wall were the forts the remains of which could be seen at Housesteads and Chesters etc.

Mr Pope described how the wall was manned and the arrangements of the milecastles and forts. He suggested that since so much of the Wall and fortifications could be traced the preliminary survey work carried out by the Romans must have been of a high order.

Dr W. Court (vice president) who acted as chairman of the second half of the session thanked Mr Pope for the presentation and added his congratulations to those of the audience many of whom had commented on the excellent quality of the presentation.

Mr A. Wright, president, with B.P. Conference speakers Mr Alec Campbell, Councillor Pope and Dr W. Court, vice president.

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A PHARMACY IN VICTORIAN LONDON

The combination of Post Office and pharmacy, the production of mineral water together with some painstaking research were combined in a fascinating talk by Dr Joan Schwitzer at a meeting of the BSHP on May 22.

Dr Schwitzer's subject was a 150 year old pharmacy in Highgate London. In Pigots "Directory of the Home Counties" 1823-24 there was a reference to Thomas Henry Dunn Chemist & Druggist at Highgate. In later editions there is a reference to the "soda water etc manufactory of Thomas Henry Dunn at Highgate". By 1832 Dunn had taken on a partner and they were listed as "chymists and drug grinders" and "soda water etc manufacturers".

In the 1832-4 edition Pigot reported about Highgate:—

> "The only article under the heading of manufacturers is that of soda water carried on here upon a very extensive scale, by Messrs Dunn and Morris, who have acquired considerable celebrity from this refreshing beverage; the superiority of the article made here, over that produced in many places, is mainly attributed to the well known and acknowledged excellence of the Highgate waters".

The 1840 edition of Pigot's Directory wrote in similar terms of the manufacture "by Mr Dunn at the pharmaceutical laboratory".

The manufacture was carried on by Dunn's successors:—

Frederick Rugge Lloyd	1840 - late 1850's
Parton John Hains	c 1859 - 1863
William Morgan Capner	1863 - c 1870
Walter William Harris	c 1870 - c 1878

(Harris also had a pharmacy at Finchley and The "Park Hall Mineral Water" Factory)

Henry G. Benvenuto Harris	c 1879 - c 1889

Dr Schwitzer said that in 1978 many Victorian mineral water bottles embossed "Harris Highgate and Finchley" were unearthed when the rear of the old pharmacy was redeveloped. At the same time the old mineral water factory remains were discovered and there had been much discussion about the siting to the walls, drains and other finds during the industrial archaeology "dig".

The speaker also referred to the prescription books and ledgers of the Highgate Pharmacy covering the period 1813-1864, specially noting the preparations supplied by Thomas Henry Dunn to Earl Mansfield of Kenwood (The Third Earl, David William Murrary, 1777-1840).

In the Post Office archives at St Martin's La Grand London EC1 the volume listing postmasters outside London as on February 5 1829 showed 572 appointments. Eleven were listed as "druggists" or "chemists and druggists". They were at — Barnsley, Bewdley, Bicester, Brixham, Dorking, Denbigh, Henley, Newton Abbot, Warwick, Whitechurch (Hants) and Salop. The archives also record 999 appointments during the period 1830-1849 forty of which were chemists and druggists (or their widows), they were:—

1830	Bewdley, Brigg, Ashby De La Zouche
1831	Ruthen, Dorking
1832	St Albans
1836	Bangor
1837	Ipswich
1838	Leatherhead, Couridge, Barnet
1839	Accrington (Lancs), Clisherve, Helstone, Stockbridge
1840	Avonmouth, Ollerton, Caxton, St Asaph, Goole, Brixham, Sleaford, Bridgend, Trowbridge, Wokingham, Bedale, Braintree, Pembroke
1843	Bedale, Newnham, Barnet
1844	Haslemere, Coleshill
1847	St Ives, Somerton, Maidenhead, Pembroke, Chumleigh
1848	Namptwick, Cheadle

SPRING CONFERENCE 1980

A meander round Bradford with a camera and a critical eye provided an amusing after dinner lecture on Friday evening entitled "Hysterical Architecture in Bradford". It was given by Mr J.H. Ayers, Bradford University. He praised and criticised local buildings erected by the Victorians.

During the final session on Sunday morning another member of the University Mr R. Hindley traced the derivation of "Place Names in Yorkshire". On Saturday evening at East Riddlesden Hall members were entertained by the St Wilfred's Quartet. Their programme was not only unusual in that the "quartet" was a "quintet" but in the wide choice of music from the 16th and 17th centuries ending with a modern rendering — "The Pharmaceutical Psalm". The final verse was:—

> Glory be to the ancient apothecary
> And to all Pharmacists and the the NHS
> As it was in the beginning with leeches
> Is now and for ever shall be Placebos without end.

During the annual general meeting on the Saturday morning the president and members of the Society welcomed Dr A. Wankmüller Tübingen, West Germany who in his reply brought greetings and good wishes not only from the German History of Pharmacy Society but also from Dr K. Zalai of Budapest.

British Pharmaceutical Conference: Concentrating on every word.

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